CHAPTER 2

CREATIVITY AND SYNECTICS MODEL

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2.1 THE CREATIVE URGE

The creative urge is human and mysterious of all individual attributes. There has been a staggering quality of marvellously world’s cultures in which creativity flowered abundantly during certain epochs, and then dropped off like a spent flower when whatever psychic energy had fuelled its growth was used up. Creativity is not just isolated work of genius but a fertile continuum of human life into which speeds from all may fall and sprout. Certain individuals, too, have been blessed with above all other people. It is also an ordinary individual on any given day may satisfy the definitions of the verb create: to bring into beings causes to exist.

The essence of creativity resides in qualities like the original, novel, ingenious, unexpected and inventive appears in anyone. The creative process involves both skills and imagination, and it requires an inventiveness and originality. One way to track the creative urge is to examine how famous scientific breakthrough occurred. What are the steps that lead to burst of original thinking. Second way is to see how highly creative people have explained their own methods. A third way to examine the creative process is to analysis the environment that attempts to identify creative components.

There are various types of thinking. Among them specific are directly related to creative thinking. It is required to be aware of them and their components to understand the creative thinking. There are certain bases for creativity which are to be discussed below in the coming captions.

2.2 CONVERGENT THINKING

Convergent thinking is the major approach to problem solving. It is that which leads to a narrowing of alternative until one solution is arrived out. It uses systematic reasoning processes in a search for the right answer. It uses
facts to solve problems. Meaning of convergent thinking could be understood from the following discussion.

2.2.1 Reproductive Thinking

Reproductive thinking as Birch (1951) believed: "It is characterized by the solution of problems by means of stimulus equivalence in the novel situation or problem and in the previously mastered situation. Thus, it and transfer of training are to be considered closely similar if not identical phenomena."

It is a process of arriving at a solution through the direct application of previous learning.

2.2.2 Productive Thinking

In productive thinking past experience is repatterned and restructured to meet current demands, and is thus the counterpart of reasoning.

It is not merely the process of arriving at solution through the direct application of previous learning.

2.2.3 Logical Thinking

Logical thinking is a way of using mind. There are specific techniques that can be used to develop skills in logical thinking. Goodwill and extortion are not enough to develop skill, one needs actual settings in which practice these tangible techniques to develop logical thinking.

2.2.4 Critical Thinking

A general phase of intellectual activity which cuts across many thought processes in critical thinking method of logical analysis, inference, deduction, incubation and evaluation are commonly included. Various authors suggest policies and procedures for development of critical thinking, organized in keeping with their particular analysis of thinking process.

Provisions of opportunities for growth in intellectual abilities and skills through improvement of comprehension, application, analysis and evaluation are required. To enhance comprehension, it is urged a programme in school aimed at avoiding careless generation, preventing confusion of words with
their meaning, using who-what when-where indexes. Emphasis should be made on Dewey’s five steps: identification of the problem, formulating of hypotheses, deductive consequences of the hypotheses, gathering more data if necessary and drawing conclusions.

2.3 DIVERGENT THINKING:

A Base of Creative Thinking:

Divergent thinking leads to a broadening of the definition and criteria of the problem so as to generate a wide variety of possible solutions, many of which are acceptable and some of which may be creatively superior. Divergent thinking is identified by fluency, flexibility, originality and elaboration in a process that is there wheeling and imaginative. Divergent thinking is free to develop its own data, raise its own questions or take new directions.

The unique features of divergent problem are a variety of responses produced. The product is not completely determined by the information, that is to say that divergent thinking does not come into play in total process of reading a unique conclusion, for it comes into play wherever there is trial and error thinking. The well known ability to word fluency is tested by asking the examinee to list words satisfying a specified letter required. This ability is now regarded as a facility in divergent production of symbolic units. The parallel semantic ability has been known as identical fluency. The divergent production on class is believed to be the unique feature of a factor called spontaneous flexibility. In this, subject goes frequently from one class to another. When subject goes to think about one class to use- it is to be called identical fluency.

A unique ability improving relations is called associational fluency. One factor pertaining to the production of system is known as expressional fluency.

A factor that has been called originality is recognises as adoptive flexibility with semantic material where there must be a shifting of meaning.
The examinee must produce the change in meaning and so come up with novel, unusual, clever ideas. The number of clever responses given by an examinee is his score for originality.

Ability to produce a variety of implications is elaboration of given information.

They all, above mentioned are the divergent thinking abilities and they are the base for creativity.

Focus on different style of thinking helps to illuminate discussions of divergent thinking and convergent thinking. The distinction between convergent thinking which uses systematic reasoning process in a search for the right answer and divergent thinking which is marked by fluency, flexibility, originality and elaboration in a process that is more free-wheeling and imaginative. In a sense, convergent thinking uses facts- to solve problems while divergent thinking is free to develop its own data, raise its own questions or take new directions. To some extent, these types of thinking should be considered as characteristic style or modes for given individuals, not as better and proper approaches to problems.

Whitmill (1969) found that when teachers used the discussion technique, the students improved in divergent thinking and that the lecture-recitative technique fostered convergent thinking of pupils.

2.4 LATERAL THINKING:

The other base of Creative Thinking:

Lateral thinking is closely related to creativity. Edward De Bono (1973) suggested in his book Lateral Thinking (1973) that at school the emphasis has traditionally always made on vertical thinking which is effective but incomplete.

Vertical thinking is a traditional type of thinking. It is one move toward by sequential steps, each of which must be justified. Correct solution would be impossible. One selects act only what is relevant.
Lateral thinking emphasis the effectiveness of vertical thinking. Vertical thinking develops the ideas generated by literal thinking. One could not dig a hole in a different place by digging the same hole deeper. Vertical thinking is used to dig the same hole deeper, and lateral thinking is used to dig a hole in a different place. Vertical thinking in itself is dangerous because it is useful to some extent. The exclusive emphasis on VT in the past makes it all the more necessary to teach lateral thinking. VT alone is not sufficient. VT by itself can be dangerous.

Insight and humour both involves restructuring but with more emphasis on escape from restricting pattern. Lateral thinking involves restructuring, escape and the provocation of new patterns. It is closely related to creativity but where creativity is too often only the description can only admire a result but one learns to use a process.

There is about creativity a mystique and intangible. This may be justified in the world where creativity involves aesthetic sensibility, emotional rescuable and a gilt for expression. But it is not justified outside that world. In order to use creativity one must rid it of this area of mystique and regard as a way of using mind- a way of handling information.

Lateral thinking is concerned with the generation of new ideas. New ideas are stuff of change and progress in every field from science to arts, from politics to personal happiness. It is also concerned with breaking out of prison of old ideas. It leads to this change in attitude and approach to looking in a different way at things which have always been looked at in the same way. Liberation from old ideas and the stimulation of new ones are twin aspects of lateral thinking.

Lateral thinking like logical thinking is a way of using mind. Logical thinking is a way of mind and attitude of mind. There are specific techniques that can be used just as specific techniques in logical thinking. Goodwill and exhortation are not enough to develop skill in logical thinking. One needs is
an actual setting in which to practice and some tangible techniques with which to practice.

From an understanding of techniques and from fluency in their use, lateral thinking develops an attitude of mind. Lateral thinking is not same magic new system. Lateral thinking is a very basic part of thinking and that one can develop some skills in it.

**2.5 CREATIVITY VIEWED AS**

Psychologists and educationalists have experimented with life from various angles and at various levels. Arnold Toynbee (Historian- 1964) defines creativity as to give a fair chance to potential; creativity is a matter of life and death of society. Potential creative ability can be stratified, started and satisfied by prevalence in society of adverse attitude of mind and behaviour. Torrance (1962) defined creativity as it takes little imagination to recognize that the future of our civilization depends upon the quality of creative imagination of our next generation. According to Indian Philosophers creativity can be defined as “May in his ability to create new forms.” Creativeness based on the needs of man and realities of his nature. The pioneer work in this field had been done by Guilford (1968) who believes it to be divergent thinking ability involving sensitivity to problems, flexibility, fluency, originality and elaboration. Vat (1971) believes that inner directed, ordinarily not capable of being elicited at will. Rawt and Gary (1971) also remarked as the invention of something that is new, rather accumulation of skills or the exercise of books’ learned knowledge.

Creativity is viewed as originality, as process and as product as discussed below.

**2.5.1 Creativity as Originality**

Thurston (1952) argued whether or not society regards an idea as novel is immaterial. He maintained that an act is creative if the thinker research a solution is a sudden closure which implies some originality for him. The idea must be artistic in nature, mechanical or theoretical. It might be administrative
if it solves and organizational problem. It is a broad enough to encompass a new slogan, a clever chess more, or a new football play. Stewart (1953) shares this view, maintaining that productive creative thinking may occur even if the idea has been produced by someone else at an earlier time.

Stein (1953) said that “Creativity must be defined in terms of culture in which appears, to him originality or ‘novelty’ implied that the creative product did not previously in the same form.” It means a reassembling of existing materials or knowledge, but it must contain new elements which the previous product did not. He goes a step further to insist that the original work, in order to meet his definition of creativity, must be accepted as useful satisfying by a group at the same time when it is produced.

**2.5.2 Creativity as Process**

It can be defined as, “one discovers something new, rediscover that has already been discovered by another, or rearranges existing knowledge- a rearrangement which may well involve an additional to knowledge.”

Suznue (1951) Langer observes that “most discoveries have suddenly been things that were always there.” She compares a newly created idea to a light that “illuminates presences which simply had no form all for us before the light fell on them. We turn the light here, there, and everywhere, and the limits of thought recede before it.”

Edger Dale (1968) of Ohio state’s University once illustrated as process with the following anecdote.

“When C was teaching arithmetic I discovered that one multiplies by 9 the digit in the answer is always total 9. Doesn’t everybody know that? I didn’t know it; and for me it was a discovery.”

Spearman (1930) defines creativity as a process of seeing or creating relationships with both conscious and subconscious process operating. He believes that when two or more ideas are presented, a person may perceive them to be a various ways related (hear after, the cause of, the result of, a part...
of, etc.). He also holds that when any item and a relation to it are cognized, then the mind can generate in itself another item so related.

Barceló (1961) divides the thinking processes involved in creation into two kinds: Cognito, to shake and throw things together and intelligo, to choose and discriminate from many alternatives and then synthesize and blind together elements in new and original ways. What he views as cognito is apparently similar to what Kubic (1958) describes as taking place in the pre-conscious. The preconscious is in this sense able rapidly to bring together experiences and memories—things half remembered, to join opposites, and discover relationships at speeds impossible to obtain in the conscious system. Although the resulting institutions, the flashes of insight may spring from the pre-conscious, they will still need refining and verification.

2.5.3 Creativity as Product

It assumes that the subject will produce something new, something that involves novelty, originality and serious effort.

Haimnowitz and Maimowitz (1968) emphasis that there is a factor in creativity which relates to the product itself as they state “Creativity is the capacity to innovate, to invent, to place elements together in a way in which they have never been placed before, such that their value or beauty is enhanced.

Thus the creativity is the discovery of a new relationship among the phenomena in the physical world which is new to the child.

2.6 CREATIVITY: ITS COMPONENTS

Some psychologists regard the phenomenon of creativity as a single dimension of personality. Guilford thinks that the creative disposition is made up many components. Being multi-dimensional aspect creativity can be measured by factor analysis on the basis of an aptitude project of Guilford and his associates. The components of creativity can further be sub-divided into groups.
In India, Chauhan and Tiwari (1983) discovered eight creativity components from their component analysis study in 1977. From these eight components four are those which are mentioned by Guilford. The components have been explained below in detail:

1) **Creative Production**: It refers to possessing both literary and constructive creativity. The semantic contents through divergent thinking give units and figural contents, resulting in transformation.

2) **Fluency**: It refers to rapid flow at ideas and tendency to change directions and modify information. It is the quantitative representation of all the units within all classes. Fluency is of four types, namely;
   a) **Ideational Fluency**: It is the generation or production where free expression is encouraged and where quality is not evaluated.
   b) **Expressional Fluency**: It refers to the production of new ideas to fit a system or logical theories. This facilitates the construction of sentences.
   c) **Associational Fluency**: It indicates production of ideas or words from a restricted area in equal relationships.
   d) **Word Fluency**: It is the generation words of specifically required epithets. It is concerned only with words. It has drawn by divergent process using semantic content to give a product of unit in a table. Various to measure word fluency use prefix, suffix or first or last letter of words.

3) **Originality**: It refers to unusual ideas and suggestion for unusual applications of particular objects. It indicates unconsciousness or newness in the product.

4) **Flexibility**: It is the readiness to change whatever the behaviour to meet changing circumstances. It represents number of classes of objects or traits ideas produced. It indicates in how many distinct ways an individual can respond to a student. Flexibility is of two types.
   a) **Spontaneous**: It is the production of diversity of ideas in a relatively unrestricted situation, and,
b) Adaptive Flexibility: It is the same divergent transformation quality which involves changes.

5) Ingenious solution to problem (ISP): It is inventive. It is the right answer choice among many alternatives ones.

6) Elaboration: It refers to the expanding and combining activities of higher thought. It shows production of detailed steps, variety of implications and consequences, which can be quantitatively measured.

7) Sensitivity to Problems: It indicates the receptivity for problems when the creator sees defects, needs, deficiencies, oddities, notabilities and sees what must be done. Whether the problem is simple or complex, he attaches it from various angles.

8) Redefinition: It is closely related to flexibility and originality that arise from transformation, specifically convergent productions. It is the ability to re-arrange ideas, concepts, people and things to shift the function of objects, and use them in new ways. It can be applied to different type of contents in the same way or figural, symbolic, semantic etc. and they can be named with their names as figural redefinition, symbolic redefinition and so on and so forth.

Thus, it is evident that the concept of creativity components emerges from Guilford's divergent thinking technology. The components of creativity remain unique in their content production relationship.

2.7 HURDLES OF CREATIVITY

Everyone has within him the basic capacity to be creative. No person likes to think of himself as average. Before worthwhile and original work can begin, the creator must master skills necessary to express his ideas. The creative process is as highly personal and individualistic as the individuals who to the creating. But one time or another, all creative people must go through essentially the same step (1964). They find source of inspiration, express their ideas, reflect on them and refine them to the point of fruition.

There are three different types of blocks possessed by most individuals that inhibit creative thinking (1974). They are:
a) Perceptual block, 
b) Cultural block, and 
c) Emotional block.

a) The first one is perceptual block.

These are the types of blocks that makes persons "what to kick themselves", for not having seen the solution previously. That causes persons to begin their work in problem solving without the purpose or goal in mind. These have to do with their statement of the problem, their biases toward and pre conceived notions about the problem. While persons are not talking about attitudes as such; it should be recognized that there is little in their outward behaviour that when they discuss thinking in behaviour. These perceptual blocks are:

- difficulty in isolating the problem,
- difficulty caused by narrowing the problem from much,
- the inability to define terms,
- failure to use all of the senses in observing,
- difficulty in seeing remote relationships,
- difficulty in not investigating the obvious, and
- failure to distinguish between cause and effect.

b) A second set of block one turn is cultural. These are caused by the way that one has been taught to believe as right or wrong, good or bad. The cultural blocks to creativity are some of the most difficult to eliminate. It requires a certain amount of courage to create. These are the:

- Desire to conform to an adopted pattern.
- One must be able to practical and emotional above all, so often judgement comes into play too quickly.
- It is not polite to be too inquisitive or wise to doubt everything.
- Overemphasize on competition or on co-operation.
• Too much faith in statistics.
• Difficulties arising from over-generalization.
• Too much faith in reason and logic.
• Tendency to follow the all-or-nothing attitude.
• Too much or too little knowledge about the field in which one is working and
• Belief that indulging in fantasy is worthless.

c) Finally, everyone has the emotional blocks,

which are within all because of insecurities all feel as individuals.

All individual feel insecure to some extent. These blocks are:
• Fear of making a mistake or making a fool of oneself.
• Grabbing the first idea that comes along.
• Rigidity in thinking.
• Over motivation to succeed quickly.
• Pathological desire for security.
• Fear of supervisor and destruct of colleagues and subordinates.
• Lack of drive in carrying a problem through a completion and test, and
• Lack of drive in putting a solution to work.

Functional fixedness (1978) is a block to creativity. When facing a problem, subjects sometime get a mental set that fixes or limits the way that most of the people tackle the problem. Psychologists call such difficulties as functional fixedness.

2.8 OVERCOMING THE HURDLE IF CREATIVE THINKING

There is no magic formula for removing the bind creative thinking. Essential at all time is a positive attitude, rooted in self analysis and desire to improve. The person who has been toiled in a creative problem must begin his new attempts by questioning: what caused the blocks? How can one remedy it? Awareness is the key to overcoming creative hurdles. Subject must be constantly aware of all the different way in which subject thinking and idea
output may be blocked (1971). The first step toward a remedy, therefore, is to recognize these blocks. Design checklist, develop and keep it in front of subject when he is working on problem. One can device such checklist. Subject should refer it regularly when he is temporarily halted on problem. He should use imagination and all of his creative functions. Above all have confidence.

Eugene Randsepp suggests numerous activities, attitudes and strategies for increasing creative productivity, nearly all of which are consistent with known principles of creative problem solving. These suggestions can contribute to understanding the nature and nurture of pupil's creativity as well as overcoming the blocks to creative thinking. The steps to more ideas are listed as under.

Creative power is a broad background of accumulated knowledge. To increase the fund of total experience one should set time aside to read in other field. Take notes while reading. Anything as significant stimulating, or interesting should be preserved for later reference. Collection and filing of clippings, notes and ideas that seem to be original are useful. One should look them over occasionally which stimulate him idea production. One should attempt to work or wire on a problem outside his own problem which will increase his ability to incorporate new information and ideas into his own problems. Moving about in tried circle and society is useful. Ideas, which spark new, must be exchanged with others. One should cultivate hobbies like chess, bridge and puzzle solving which would be helpful in overcoming the hurdles in creative thinking.

Creative individual has to have an intimate knowledge of the basic principles and fundamental concepts of his field. One should not be too quick to throw out unorthodox or unusual ideas. He should think of, about it, do minor changes that would make them practical. It is important to look for the key factors of problem and try to isolate them. Pinpointing the problem is an essential step to undertake.
For hand of ideas, a checklist is useful to get started on solving a specific problem. First of all, list the ideas and various approaches that might solve the problem. No idea should be rejected at this stage as of no consequences until later is proven so. One must try again and again, in spite of discouragement.

Feeling of pressure is good to marshal aid from subconscious source or from one's own past experience.

One must boost his lagging enthusiasm. There are some ways to increase lagging creative derive are mentioned below.

Suspension of judicial thinking is good one way. During the heat of creative problem solving, criticism and judgement must be suspended. A sense of freedom from time restriction is an important factor in the solution of problems, even though a subjective sense of pressure and need are there. One must not trust on one's memory. An idea that occurs during a brief amount is irretrievably lost it not recorded on the spot. Proper mode is important for problem solving but one must not wait for it. One should pick up a pen or pencil and start writing done the different aspects of problem, the different approaches might use, and the directions one's might want to explore.

Effective creative process requires continuous shifting between involvement and head way, even after one's second wind, he must drop problems and do something different. Break off and relaxation and useful. The ideas most occurred during passive and relaxed states or even under fatigued or half-waking conditions. Determination of the physical conditions during which one regularly do one's best thinking is helpful. In fact, one should deliberately make an effort, and then deliberately assume it attempting to solve problems. During problem solving, one must avoid destructions and instructions as much as possible. The ability to maintain a basic peace of mind even when tackling problems is an important. Development of a retrospective awareness of the periods when one solved his problems creatively is also important. Self-knowledge in the area of creativity will aid idea production.
One should be alert for ideas when riding in bus, when at movies and especially the brief periods proceeding and following sleep. An enormous amount of hard-work goes into the polishing of an idea before it becomes workable things.

These are the various ways to overcome the hurdles to creativity. Creative thinking techniques are useful to use these ways to overcome the blocks to creative thinking which are discussed in the coming caption.

2.9 TECHNIQUES TO DEVELOP CREATIVITY

Creative thinking techniques are conscious and deliberate procedures for producing new idea and combinations of ideas. "The Art of Creative Thinking", assert whiting, "is the term generally applied to a body of principles and techniques which have evolved to accomplish this end"

"It is wrong to say that the process of creative thought cannot be taught as to say that medicine or engineering cannot be taught. There is a reason for anything that happens in the world. We can find the reason. When we actually learn how, it is an easy matter to go ahead and make things happen (1964).

Techniques to develop creative thinking are:
Brainstorming, attribute listing, morphological synthesis, buzz session (Phillips 66) and synectics.

1) Brain Storming:

Brain storming is a formal setting for the use of lateral thinking. In itself it is not a special technique but special setting which encourages the application of the principles and techniques of lateral thinking while providing a holiday from the rigidity of vertical thinking. Brain storming is a group activity and individual activity. Nor does it require any teacher intervention(1978). The main features of BS session are:

- Cross stimulation,
- Suspended judgement, and
- The formality of the setting.
BS technique originated and popularized by Alex F. Osborn. It operates on the differed judgement. It involves rapid-fire, spontaneous from a group participating freely large number of ideas which are wild or sensible.

Out of numerous ideas that results, there is a maximum of assurance that many good ideas will be generated. One need to move to a new arrangement of information and then one can carry on from there. The new arrangement of information is a provocation which produced some effect. In it the provocation is supplied by the ideas of others. Since such ideas come from outside one’s own mind they can serve to simulate one’s own ideas. In a Brain Storming session one gives out stimulation to others and he receives from other members. During BS session the ideas are recorded by note takers and perhaps by a tape recorder as well. These ideas can then be played back at a later date in order to provide fresh stimulation. Although the ideas are not new the context has changed so the old ideas can have a new stimulating effect.

There is no evaluation until the all ideas are in. As a result, even shy, non-verbal children are often caught up in the excitement of producing ideas. In addition to contributing ideas of their own, children are also encouraged to suggest how two or more ideas may be combined. If five percent of ideas are accepted during the evaluation session, the session may be considered successful. Basic principles which characterize this technique are:

- Accept every idea, impractical as it may seem,
- Emphasize quantity rather than quality,
- Prohibit all criticisms of ideas during the idea producing stages,
- Encourage combination of ideas, and
- Defer evaluation until the second stage of the process-following the ideas-producing stage.

Brain storming provides a climate of psychological safety in which encouragement, respect for the ideas of the others, and excitement of group success is fostered. It promotes uninhibited imagination and excuses the
individual from having to defend a particular idea at the time he suggested. It, later, when the list of suggestion is carefully scrutinized for fruitful ideas the originator of a “wild” or “useless” idea is not embarrassed by having the group know that his idea was not accepted as is the case in traditional activities involving production of ideas.

2) **Attribute Listing:**

It is simple and an effective method for generating creative ideas to improve or change virtually anything. Here the child is asked to itemize important attributes of each part of a product and then consider each attribute as a source of potential change or improvement. For example, an object as simple chalk, students identify the attributes of size, colour, shape, material and use. Then considering changes for each of these individual attributes, ideas for a large variety of chalk may be quickly produced. In carrying out a market survey students can learn to identify and improve the attributes of material, market, cost and production processes. The idea is used frequently in language arts when students are able to come up with new ideas for writing short stories by identifying and deliberately changing such significant attributes as the setting, the characters, the plot, the period. Although this is more mechanical then some of the techniques discussed, it does sensitize students to the various properties of objects and gives them a simple but productive means of innovating.

Thus, attribute listing method was discussed by Crawford (1954).

3) **Check-list:**

With checklist procedure, students consider each item on a prepared list. A common checklist which is aimed stimulating ideas for changing a product consists of seven items:

- Add or subtracts something,
- Change colour,
- Vary materials,
- Rearrange parts,
• Vary shape,
• Change size, and
• Modify design or style.

College students in an experiment (1971) produced a significantly larger number of creative ideas for changing or improving a thumb tack and a kitchen sink that did the control group who did not use this checklist. Among the suggestion that came forth for improving the kitchen sink were adding a soap or hand lotion dispenser, suggesting orange or silver for colours, using materials such as copper, nylon, or plastic, by increasing or decreasing the size, or by designing it in a oriental or Scandia van mode. Checklists are mostly used for stimulating original thinking. Not everyone is a self-starter. Many children need that first encouragement to think on a more critical level. Checklists are intended to supplement, not to replace, the more intuitive modes of creative thinking.

4) Morphological Synthesis:

This technique closely resembles that of attribute listing. It may be used to produce more idea combinations than any other subjects are asked to first identify two or more important characteristics of dimensions, colour or shape, of a problem and list specific values such as red, blue, green, square, triangular, round, rectangular; for each. Next they proceed to examine all possible combinations, making use of one value of each characteristic.

The weakness of this technique is that it might prevent a thinker from using a more original approach to the problem, using more imaginative, different perspectives.

5) Buzz Session (Phillip-66):

This technique to develop creativity is developed by Prof. of speech, Donald J. Phillip of Hillsdale College and it is described as a mass brain storming session. It may be used following a lecture, panel discussion, movie, or excursion. The audience or class is divided into as many groups as are
needed to involve every individual as a participant. A chairman is chosen from within each group. It is important that he understands the techniques of the buzz-session.

Once the groups are formed and the brain storming technique explained fully, each group of six is on its own. Originally the groups met for six minutes. The length of time pre-determined and may range from six to ten minutes. As a signal from the leader each group stop producing ideas and moves into the evaluating stage, selecting those ideas which to have merit. At the conclusion of the evaluation phase of the session, usually this fit into the total of the six to ten minutes- the chairman of each group is invited to the front of the room to present the ideas selected to the entire group. The leader of each group presents results of the session without comment. The chairmen of the meeting summarize the general consensus from the group report.

Above are some techniques and experiments, which teacher may use to develop creative thinking abilities of the students. The researcher has used Synectics method of teaching to develop creative writing abilities of the students.

2.10 SYNECTICS: ENHANCING CREATIVE THOUGHT

Synectics is an interesting approach to the development of creativity designed by William J.J. Gordon and his associates (1961). Gordon's initial work with synectics procedures was to develop "creativity groups" within industrial organizations- that is, groups of persons trained to work together to function as problem solvers or product developers. In recent years, Gordon has adapted synectics for use with school children and materials containing many of the synectics activities are now being published. The chief element in synectics is the use of analogies. In synectics exercises, students "play" with analogies until they relax and begin to enjoy making more and more metaphoric comparisons. Then they use analogies to attack problems or ideas.

Ordinarily, when we are confronted with a task- say a problem to be solved or a piece of writing to be produced- we consciously become logical.
We prepare to write by making an outline of the points to be made. We analyze the elements of a problem and try to think it through. We use our existing storehouse of words and phrases to set down our ideas; we use our storehouse of learned solutions to face a problem.

For most problems and tasks of expressing ourselves our logic works well enough. What do we when our old solutions or ways of expressing ourselves are not sufficient to do the job? That is when we use synectics. It is designed to lead us into a slightly illogical world- to give us the opportunity to invent new ways of seeing things, expressing ourselves, and approaching problems.

For example, school officials struggle with the problem of how to deal with absenteeism. When a student repeatedly fails to come to school, what do they do? Frequently, they turn to punishment. And what punishment is available? Frequently, suspension. That is logical, isn't it? To choose a severe punishment to match what is regarded as a severe infraction? The trouble with the solution is that it imposes on the student as a penalty exactly the same condition that the student has chosen in lieu of school. Synectics is used to help us develop fresh ways of thinking about the student, the student's motives, the nature of penalties, our goals, and the nature of the problem. We have to deliberately avoid what appears to be logical thought because it leads us to an inadequate conception of the problem and, thus, an absurd (if logical) solution.

**Goals and Assumptions**

Gordon grounds synectics in four ideas that challenge conventional views about creativity.

1. Creativity is important in everyday activities. Most of us associate the creative process with the development of great works of art or music, or perhaps with a clever new invention. Gordon emphasizes creativity as a part of our daily work and leisure lives. His model is designed to increase problem-solving capacity, creative expression, empathy, and
insight into social relations. He also stresses that the meaning of ideas
can be enhanced through creative activity by helping us see things
more richly.

2. The creative process is not at all mysterious. It can be described, and it
is possible to train persons directly to increase their creativity.
Traditionally, creativity is viewed as a mysterious, innate, and personal
capacity that can be destroyed if its processes are probed too deeply. In
contrast, Gordon believes that if individuals understand the basis of the
creative process, they can learn to use that understanding to increase
the creativity with which they live and work, independently and as
members of groups. Gordon’s view that creativity is enhanced by
conscious analysis led him to describe it and create training procedures
that can be applied in schools and other settings.

3. Creative invention is similar in all fields- the arts, the sciences,
engineering- and is characterized by the same underlying intellectual
processes. This idea is contrary to common belief. In fact, to many
people, creativity is confined to the arts. In engineering and the
sciences, however, it is simply called by another name: invention.
Gordon maintains that the link between generative thinking in the arts
that in the sciences is quite strong.

4. Gordon’s fourth assumption is that individual and group inventions
(creative thinking) are very similar. Individuals and groups generate
ideas and products in much the same fashion. Again, this is very
different from stance that creativity is an intensely personal experience,
not to be shared.

The Creative State and The Synectics Process

The specific processes of synectics are developed from a set of
assumptions about the psychology of creativity. First, by bringing the creative
process to consciousness and by developing explicit aids to creativity, we can
directly increase the creative capacity of both individuals and groups.
A second assumption is that the "emotional component is more important than the intellectual, the irrational more important than the rational" (Gordon, 1961, Pg. 6). Creativity is the development of new mental patterns. Non-rational interplay leaves room for open-ended thoughts that can lead to a mental state in which new ideas are possible. The basis for decisions, however, is always the rational; the irrational state is the best mental environment for exploring and expanding ideas, but it is not a decision-making stage. Gordon does not undervalue the intellect; he assumes that logic is used in decision making and that technical competence is necessary to the formation of ideas in many areas. But he believes that creativity is essentially an emotional process, one that requires elements of irrationality and emotion to enhance intellectual processes. Much problem solving is rational and intellectual, but by adding the irrational we increase the likelihood that we will generate fresh ideas.

The third assumption is that the "emotional, irrational elements must be understood in order to increase the probability of success in a problem solving situation" (Gordon, 1961, Pg. 1). In other words, the analysis of certain irrational and emotional processes can help the individual and the group to increase their creativity by using irrationality constructively. Aspects of the irrational can be understood and consciously controlled. Achievement of this control, through the deliberate use of metaphor and analogy, is the object of synectics.

**Metaphoric Activity**

Through the metaphoric activity of the synectics model, creativity becomes a conscious process. Metaphors establish a relationship of likeness, the comparison of one object or idea with another object or idea by using one in place of the other. Through these substitutions the creative process occurs, connecting the familiar with the unfamiliar or creating a new idea from familiar ideas.
Metaphor introduces conceptual distance between the student and the object or subject matter and prompts original thoughts. For example, by asking students to think of their textbook as an old shoe or as a river, we provide a structure, a metaphor, with which the students can think about something familiar in a new way. Conversely, we can ask students to think about a new topic, say the human body, in an old way by asking them to compare it to the transportation system. Metaphoric activity thus depends on and draws from the student's knowledge, helping them connect ideas from familiar content to those from new content, or view familiar content from a new perspective. Synectics strategies using metaphoric activity are designed, then, to provide a structure through which persons can free themselves to develop imagination and insight into everyday activities. Three types of analogies are used as the basis of synectics exercises: personal analogy, direct analogy, and compressed conflict.

**Personal Analogy**

To make personal analogies requires students to empathize with the ideas or objects to be compared. Students must feel they have become part of the physical elements of the problem. The identification may be with a person, plant, animal, or nonliving thing. For example, students may be instructed, "Be an automobile engine. What do you feel like? Describe how you feel when you are started in the morning; when your battery goes dead; when you come to a stop light."

The emphasis in personal analogy is on empathetic involvement. Gordon gives the example of a problem situation in which the chemist personally identifies with the molecules in action. He might ask, "How would I feel if I were a molecule?" and then feel himself being part of the "stream of dancing molecules."

Personal analogy requires loss of self as one transports oneself into another space or object. The greater the conceptual distance created by loss of self, the more likely it is that the analogy is new and that the students have
created or innovated. Gordon identifies four levels of involvement in personal analogy:

1. **First-person description of facts.** The person recites a list of well-known facts but presents no new way of viewing the object or animal and shows no empathetic involvement. In terms of the car engine, the person might say, "I feel greasy" or "I feel Hot."

2. **First-person identification with emotion.** The person recites common emotions but does not present new insights. "I feel powerful" (as the car engine).

3. **Empathetic identification with a living thing.** The student identifies emotionally and kinesthetically with the subject of the analogy.

4. **Empathetic identification with nonliving object.** This level requires the most commitment. The person sees himself or herself as an inorganic object and tries to explore the problem from a sympathetic point of view. "I feel exploited. I cannot determine when I start and stop. Someone does that for me" (as the car engine).

The purpose of introducing these levels of personal analogy is not to identify forms of metaphoric activity but to provide guidelines for how well conceptual distance has been established. Gordon believes that the usefulness of analogies is directly proportional to the distance created. The greater the distance, the more likely the student is to come up with new ideas.

**Direct Analogy**

Direct analogy is a simple comparison of two objects or concepts. The comparison does not have to be identical in all respects. Its function is simply to transpose the conditions of the real topic or problem situation to another situation in order to present a new view of an idea or problem. This involves identification with a person, plant, animal, or nonliving thing. Gordon cites the experience of the engineer watching a shipworm tunneling into a timber. As the worm ate its way into the timber by constructing a tube for itself and moving forward, the engineer, Sir March Isumbard Brunel, got the notion of
using caissons to construct underwater tunnels (Gordon, 1961, Pg. 40-41). Another example of direct analogy occurred when a group was attempting to devise a can with a top that could be used to cover the can once it had been opened. In this instance, the analogy of the pea pod gradually emerged, which produced the idea of a seam placed a distance below the top of the can, thus permitting a removable lid.

**Compressed Conflict**

The third metaphorical form is compressed conflict, generally a two word description of an object in which the words seem be opposites or to contradict each other. *Tiredly aggressive* and *friendly foe* are two examples. Gordon's examples are life-saving destroyer and nourishing flame. He also cites Pasteur's expression, *safe attack*. Compressed conflicts, according to Gordon, provide the broadest insight into a new subject. They reflect the student's ability to incorporate two frames of reference with respect to a single object. The greater the distance between frames of reference, the greater the mental flexibility.

**Stretching Exercises: Using Metaphers**

These three types of metaphors from the basis of the sequence of activities in this model of teaching. They can also be used separately with groups, as a warm-up to the creative process—that is, to problem solving; we refer to this use as *stretching exercises*.

Stretching exercises provide experience with the three types of metaphorical activity, but they are not related to any particular problem situation nor do they follow a sequence of phases. They teach students the process of metaphorical thinking before asking them to use it to solve a problem, create a design, or explore a concept. They are simply asked to respond to ideas such as the following:

**Direct Analogies**
An orange is like what living thing?
How is a school like a salad?
How are polar bears like frozen yogurt?
Which is softer—a whisper or a kitten’s fur?

**Personal Analogies**
Be a cloud. Where are you? What are you doing?
How do you feel when the sun comes out and dries you up?
Pretend you are your favourite book. Describe yourself.
What are your three wishes?

**Compressed Conflict**
How is a computer shy and aggressive?
What machine is like a smile and a frown?

**Syntax**

There are actually two strategies or models of teaching based on synectics procedures. One of these (creating something new) is designed to make the familiar strange, to help students see old problems, ideas, or products in a new, more creative light. The other strategy (making the strange familiar) is designed to make new, unfamiliar ideas more meaningful. Although both strategies employ the three types of analogy, their objectives, syntax, and principles of reaction are different. We refer to creating something new as strategy one, and making the strange familiar as strategy two.

Strategy one helps students see familiar things in unfamiliar ways by using analogies to create conceptual distance. Except for the final step, in which the students return to the original problem, they do not make simple comparisons. The objective of this strategy may be to develop a new understanding; to empathize with a shoe-off or bully; to design a new doorway or city; to solve social or interpersonal problems, such as a garbage strike or two students fighting with each other; or to solve personal problems, such as how to concentrate better when reading. The role of the teacher is to guard against premature analyses and closure. The syntax of strategy one appears in Table – 2.1.
Table - 2.1
Syntax for Creating Something

**Phase One:**
Description of Present Condition
Teacher has students describe situation or situation as they see it now.

**Phase Two:**
Direct Analogy
Students suggest direct analogies, select one and explore (describe) it further.

**Phase Three:**
Personal Analogy
Students “become” the analogy they selected in phase two.

**Phase Four:**
Compressed Conflict
Students take their descriptions from phases two and three, suggest several compressed conflicts and choose one.

**Phase Five:**
Direct Analogy
Students generate and select another direct analogy, based on the compressed conflict.

**Phase Six:**
Re-examination of the Original Task
Teacher has students move back to original task or problem and use the last analogy and/or the entire synectics experience.

By contrast, strategy two, making the strange familiar, seeks to increase the students’ understanding and internalization of substantially new or difficult material. In this analogy, metaphor is used for analyzing, not for creating conceptual distance as in strategy one. For instance, the teacher might present the concept of culture to her class. Using familiar analogies (such as a stove or a house), the students begin to define the characteristics that are present and those that are lacking in the concept. The strategy is both analytical and convergent: Students constantly alternate between defining the characteristics of the more familiar subject and comparing these to the characteristics of the unfamiliar topic.

In phase one of the strategy explaining the new topic, the students are provided with information. In phase two the teacher or the students, suggest a direct analogy. Phase three involves “being the familiar” (personalizing the direct analogy). In Phase four, students identify and explain the points of similarity between the analogy and the substantive material. In phase five,
students explain the differences between the analogies. As a measure of their acquisition of the new information, students can suggest and analyze their own familiar analogies in phase six and seven. The syntax of strategy two appears in Table – 2.2.

Table – 2.2  
Syntax for Making the Strange Familiar, Strategy two

<table>
<thead>
<tr>
<th>Phase One: Substantive Input</th>
<th>Phase Two: Direct Analogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher will provide information on new topic.</td>
<td>Teacher suggests direct analogy and asks students to describe the analogy.</td>
</tr>
<tr>
<td>Phase Three: Personal Analogy</td>
<td>Phase Four: Comparing Analogies</td>
</tr>
<tr>
<td>Teacher has students “become” the direct analogy.</td>
<td>Students identify and explain the points of similarity between the new material and the direct analogy.</td>
</tr>
<tr>
<td>Phase Five: Explaining Differences</td>
<td>Phase Six: Exploration</td>
</tr>
<tr>
<td>Students explain where the analogy does not fit.</td>
<td>Students re-explore the original topic on its own terms.</td>
</tr>
<tr>
<td>Phase Seven: Generating Analogy</td>
<td></td>
</tr>
<tr>
<td>Students provide their own direct analogy and explore the similarities and differences.</td>
<td></td>
</tr>
</tbody>
</table>

The major difference between the two strategies lies in their use of analogy. In strategy one, students move through a series of analogies without logical constraints; conceptual distance is increased, and imagination is free to wander. In strategy two, students try to connect two ideas and to identify the connections as they move through the analogies. The strategy the teacher selects depends on whether he or she is trying to help students create something new or to explore the unfamiliar.
Social System

The model is moderately structured, with the teacher initiating the sequence and guiding the use of the operational mechanisms. The teacher also helps the students intellectualize their mental processes. The students, however, have freedom in their open-ended discussions as they engage in metaphorical problem solving. Norms of cooperation “play of fancy,” and intellectual and emotional equality are essential to establishing the setting for creative problem solving. The rewards are internal, coming from students’ satisfaction and pleasure with the learning activity.

Principles of Reaction

The instructor notes the extent to which individuals seem to be tied to regularized patterns of thinking, and he or she tries to induce psychological states likely to generate a creative response. In addition, the teacher himself or herself must use the nonrational to encourage the reluctant student to indulge in irrelevance, fantasy, symbolism, and other devices necessary to break out of set channels of thinking. Because the teacher as model is probably an essential of the method, he or she has to learn to accept the bizarre and the unusual. The instructor must accept all student responses to ensure that students feel no external judgments on their creative expressions. The more difficult the problem is, or seems to be, to solve, the more it is necessary for the teacher to accept far-fetched analogies so that individuals develop fresh perspectives in problems.

In strategy two the teacher should guard against premature analyses. He or she also clarifies and summarizes the progress of the learning activity and, hence, the students’ problem-solving behaviour.

Support System

The group most of all needs facilitation by a leader competent in synectics procedures. It also needs, in the case of scientific problems, a laboratory in which it can build models and other devices to make problems concrete and to permit practical invention to take place. The class requires a
work space of its own and an environment in which creativity will be prized and utilized. A typical classroom can probably provide these necessities, but a classroom-sized group may be too large for many synectics activities, and smaller groups would need to be created.

**Using Synectics in the Curriculum**

Synectics is designed to increase the creativity of individuals and groups. Sharing the synectics experience can build a feeling of community among students. Students learn about their fellow classmates as they watch them react to an idea or problem. Thoughts are valued for their potential contribution to the group process. Synectics procedures help create a community of equals in which simply having a thought is the sole basis for status. This norm and that of playfulness quickly give support to even the most timid participant.

Synectics procedures may be used with students in all areas of the curriculum, the sciences as well as the arts. They can be applied to both teacher-student discussion in the classroom and to teacher-made materials for the students. The product of vehicles of synectics activity need not always be written: they can be oral, or they can take the form of role plays, painting and graphics, or simply changes in behaviour. When using synectics to look at social or behavioural problems, you may wish to notice situational behaviour before and after synectics activity and observe changes. It is also interesting to select modes of expression that contrast with the original topic, such as having students paint a picture of prejudice or discrimination. The concept is abstract, but the mode of expression is concrete.

Some possible uses of the creative process and its accompanying emotional states are discussed in the following paragraphs.

**Creative Writing**

Strategy one of the synectics model is an excellent instructional strategy for developing creative-writing abilities. Writing, either expository writing about a particular concept (such as friendship) or more personalized
writing (regarding an emotion or an experience), is an area of the language arts program where synectics can help students develop highly creative style of expression. The metaphoric activity stimulates students’ imaginations and helps them record their thoughts and feeling.

**Exploring Social Problems**

Strategy one is excellent for exploring social and disciplinary problems. The metaphor creates distance, so the conformation does not threaten the learner, and discussion and self-examination are possible. The personal analogy phase is critical for developing insight.

**Problem Solving**

Problem solving concerned with social issues, interpersonal relations, or problems is amenable to synectics. The objective of strategy two is to break set and conceptualize the problem in a new way in order to suggest fresh approaches to it. An example of a social issue would be how to improve relations between the police and the community. Reducing family spending is an example of an interpersonal-relations problem. Personal problems might include how to stop fighting with a friend, how to do math lessons, how to feel better about wearing glasses, or how to stop making fun of people.

**Creating a Design or Product**

Synectics can also be used to create a product or design. A product is something tangible, such as a painting, a building, or a bookshelf, whereas a design is a plan, such as an idea for a party or a new means of transportation. Eventually, designs or plans become real, but for the purposes of this model they remain as sketches or outlines.

**Broadening our Perspective of a Concept**

Abstract ideas such as culture, prejudice, and economy are difficult to internalize because we cannot see them in the same way we can see a table or building, yet we frequently use them in our language. Synectics is a good way to make a familiar idea "strange" and thereby obtain another perspective on it.
We have found that synectics can be used with all ages, through with very young children it is best to stick to stretching exercises. Beyond this, adjustments are the same as for any other approach to teaching-care to work within their experience, rich use of concrete materials, attentive pacing, and explicit outline of procedures.

The model often works effectively with students who withdraw from more “academic” learning activities because they are not willing to risk being wrong. Conversely, high-achieving students who are only comfortable giving a response they are sure is “right” often feel reluctant to participate. We believe that for these reasons alone, synectics is valuable to everyone.

Synectics combines easily with other models. It can stretch concepts being explored with information-processing family; open up dimensions of social issues explored through role playing, group investigation, or jurisprudential thinking; and expand the richness of problems and feelings opened up by other models in the personal family.

The most effective use of synectics develops over time. It has short term results in stretching views of concepts and problems, but when students are exposed to it repeatedly, they can learn how to use it with increasing skill-and they learn to enter a metaphoric mode with increasing ease and completeness.

Gordon, Poze, and their associates have developed a wide assortment of materials for use in schools, especially in the language development areas (Gordon and Poze, n.d.). The strategy is universally attractive, and its fortunate combination of enhancing productive thinking and nurturing empathy and interpersonal closeness finds it many uses with all ages and most curriculum areas.

**Instructional and Nurturant Effects**

As shown in Figure 1, the synectics model contains strong elements of both instructional and nurturant values. Though his belief that the creative process can be communicated and that it can be improved through direct
training, Gordon has developed specific instructional techniques. Synectics is applied, however, not only to the development of general creative power but also to the development of creative responses over a variety of subject-matter domains. Gordon clearly believes that the creative energy will enhance learning in these areas. To this end, he emphasizes a social environment that encourages creativity and uses group cohesion to generate energy that enables the participants to function interdependently in a metaphoric world.

FIGURE-1 Instructional and nurturant effects: Synectics Model

The method of synectics has been explicitly designed to improve the creativity of individuals and of groups. However, the implicit learning from this model is equally vivid. Participation in a synectics group invariably creates a unique shared experience that fosters interpersonal understanding and a sense of community. Members learn about one another as each person reacts to the common event in his or her unique way. Individuals become acutely aware of their dependence on the various perceptions of other group members. Each thought, no matter how prosaic, is valued for its potential catalytic effect on one's own thoughts. Simply having a thought is the sole
basis for status in this community, and the playfulness of synectics activities encourages even the most timid participant.