Teaching Creative Thinking Skills

Dr. Nagamurali Eragamreddy
Faculty of Education, Traghen,
The University of Sebha, Libya

Abstract

It is internationally recognized that teachers play a significant role in developing suitable values in their pupils. Students also learn strategies for identifying problems, making decisions, and finding solutions both in and out of school. Among them creative thinking skills play a prominent role in their learning process. Techniques developed specifically to teach creative thinking and examine how they may be applied to the classroom, are precise things to be considered. Awareness with techniques designed to improve creative thinking gives individuals a set of tools to use in their exploratory behaviour. Though there are various methods, the major innovative thinking skills that play the crucial role in learning process are visualization and creative dramatics, Torrance and Safter's incubation model, use of metaphors and analogies, divergent thinking strategies and commercial and competitive programmes. Brainstorming, the acronym scamper which is a useful tool for many creative endeavours and can assist children as well as adults in using the idea-spurring questions that can help them generate diverse ideas, and future solving problem, are the most popular innovative techniques that the teachers employ in moulding the young buds into colourful blossoms who are sole responsible to create the society more modest where we can live pleasantly. Hence, this present paper highlights the most appropriate techniques that the educators employ to motivate the knowledge seekers most effective and inspirational for the upcoming generation.

Key words: Visualization and creative dramatics, incubation model, metaphors and analogies, divergent thinking strategies, commercial and competitive programmes, brain storming

1. Introduction

To produce innovative ideas to individuals, numerous techniques, which are often called implements for creative thinking, have been designed. In order to develop commodities and uphold a competitive edge, these strategies are originated in commerce where these ideas are must. Among these techniques there are some effective ones which throw light on students to assist them become more innovative. Many scholars have approved that these strategies can be successful in serving both children and adults in producing new, appropriate ideas. It's very complicated enquiry to answer vividly and precisely why or under what conditions they work. Imitate or stimulate the cognitive processes that motivate creativity are some of the possible techniques (Lewis, 2009). Probably employing such techniques may develop attitudes or habits of mind that facilitate creativity: self-determination in verdict, eagerness to explore various options, and perseverance beyond the first idea. In any case, awareness with techniques framed to enhance creative thinking gives individuals a set of tools to use in their investigative behaviour. The knowledge seekers can employ purposeful techniques to stream their ideas in innovative directions instead of sitting and waiting for the muse.

Educators should recognize appreciate, and encourage different styles of creativity. Creativity can arise from a combination of conscious thinking and the unconscious thinking that occurs during a non-working period of incubation. So, the present paper investigates teaching creative thinking skills which play a prominent role to mould the knowledge seekers who are the sole responsible individuals for creating better place for the present and future generation.

2. Creative Thinking Skills – Meaning

There are many dominant associations that suggest the word 'creativity'. In some contexts it seems almost beyond the range of mere mortals—few of us can imagine treading in the paths of Einstein or Curie, Picasso or O'Keeffe, Mozart or Charlie Parker. Their accomplishments are the tokens for striking in creativity and power, not just contributing to their disciplines, but transforming them. Many of us, on the other hand, have shaped a latest casserole from ingredients in the refrigerator, jury-rigged a

muffler to last to the next service station, or written a poem or song for the pleasure of a loved one.

In educational institutions the word 'creative' is often used. As educators or learners, we, virtually, have had experiences with creative writing. Teacher supplies flourish with collections of creative activities or books on creative education of various subjects. Such sources often present attractive and pleasant classroom experiences without tackling the primary questions: What is creativity? Where does it originate? What experiences or circumstances permit individuals to become more creative? Without information on these more basic issues it is complicated for any teacher to create good quality decisions on classroom practices that might promote creativity in students, though group of activities can be useful.

Though many scholars hardly ever extend their investigations to explore implications of investigation and theory for classroom life, university libraries possess theoretical texts and research studies that deal with critical questions about creativity. Few theorists examine what their theories mean for the language arts curriculum or consider how the research on motivation and creativity might affect methods of grading, evaluation, or reward. Yet additional rarely are such implications explored with school-age students.

Perkins (1988) defined creativity as follows:

"(a) Original and appropriate are the both results of a creative task,

(b) A creative person—a person with creativity—is a person who fairly, routinely produces creative results" (p. 311).

Perkins' propositions attach together the concepts of creative people and creative activities in a neat practical package, though they are broad. Even so, each aspect of this simple definition poses questions. The probable characteristics most immediately associated with creativity are novelty and originality. Works of literature that emulate those before them or scientific discoveries that are purely a rework of earlier work are seldom considered creative. In order to be creative, a thought or creation must be new. Some definitions focus on characteristics of individuals whose work is determined to be creative (What is a creative person like?), whereas others consider the work itself (What makes this creative?). In either case, most definitions have two major criteria

for judging creativity: novelty and appropriateness (Parkhurst, 1999; Sternberg, 1988; 1999)

Thus, we can presume that the term 'creativity' or 'creative thinking' reveals the kind of thinking that leads to new insights, novel approaches, fresh perspectives, whole new ways of understanding and conceiving of things. The products of creative thought include some obvious things like music, poetry, dance, dramatic literature, inventions, and technical innovations. But there are some not so obvious examples as well, such as ways of putting a question that expand the horizons of possible solutions, or ways of conceiving of relationships that challenge presuppositions and lead one to see the world in imaginative and different ways.

3. Significance of creative thinking skills

Teaching creative thinking skills plays a prominent role both in teaching and learning and building a better society. The following will throw a light on the significance of creative thinking skills.

1. When we educate in a way that enhances creativity, it is specifically such stretching of patterns that we expect to attain. From different points of view, students think about content, use it in innovative ways, or attach it to new or curious ideas. These relations reinforce the links to the content as well as the habits of intelligence connected with more flexible thinking. In fact, creative thinking is one central part component of appropriate teaching and learning, a system of instruction designed to aid students observe meaning in academic material then learn and keep it by connecting it to their daily lives (Johnson, 2002). In this system, creative thinking is promoted as one of the most important strategies to assist students learn.

2. In each case, individuals created works of art or literature because they had something to communicate. The communication was not always simple to express. The ideas were sometimes hard or the forms hard to manage. Despite the difficulties, the creators persisted. They wished to allow the audience to make meaning in new ways or share a vision of the world. The process of making meaning and shared vision can be seen in the efforts of visual artists,

storytellers, musicians, dancers, myth makers, playwrights, and other creators throughout history.

3. As a vehicle for renewing and sustaining communities, the idea of creativity brings a new layer of responsibility for teachers, one that seems particularly apt in the early years of die new millennium.
4. It is missing the most basic process of creativity, the effort to communicate in many so-called creative school activities. How often does a student in school write or paint or use another form of expression not because it has been assigned, but because he or she has something to say? Others use creative processes in slightly different ways. Individuals, in these cases, exercised creative thinking to communicate and to solve problems. To address the problems of comfort in their homes, the inventors of modern lighting, heating, and cooling devices used creative thinking. Mail-order catalogues are full of devices designed to deal with less theatrical problems. Products that locate the end of the masking tape clean the Venetian blinds, or guard the shoe that works the gas pedal from scuffing all resulted from someone's creative thinking about a particular problem or annoyance.
5. In its broadest sense, Problem finding underlies all types of creativity. Some of the most basic research in problem finding was done with visual artists (Getzels & Csikszentmihalyi, 1976). Artists, in those studies, were considered to be problem finding as they manipulated materials to find ideas for their paintings. Finding the idea or theme to communicate, as well as finding a societal problem or need, can be considered problem finding. A teacher considers both of these themes as the underlying (and overlapping) purposes of creativity in Western cultures. Within the primary culture in which he or she works and teaches, individuals are often creative in their efforts to communicate an idea or to find and solve problems. Extending these processes into classroom situations can permit creative activities to happen there naturally. Introducing these procedures also holds implications for classroom learning because the aims of creativity have much in common with key attributes of learning theory.

6. The more important part of this process, many times, is realizing that a problem exists. Until their promotion survey, sales personnel at Kimberly-Clark had no understanding of a need for a throwaway handkerchief. It is tough to picture now that a few years ago no one thought offices required the now indispensable stick-on, pull-off notes. In a similar fashion, someone realized that there was a need (or at least a market) for frozen dinners, facsimile (fax) machines, and digital video disk players (DVDs) before those products existed. In scientific research, it may be at least as important to select a strong research question as it is to solve it. The investigator who first wondered if it was possible to modify the structure of genes opened up new worlds of medical study and treatment. Imagine the impact of the first human being to comprehend that the inability to record language was a problem. So it is problem finding identifying a problem to solve rather than solving a present problem.

   In the words of Psychiatrist John Ratey (2001):

   We choose every time to solve a problem creatively, or think about something in a new approach, we redesign the physical relationship in our brains. The brain has to be challenged in order to stay fit, just as the muscles, heart, and lungs must be intentionally exercised to become more resilient, (p. 364)

   Even though it is significant to distinguish the tentative nature of such inferences, many recommendations made by writers addressing "brain-based curriculum" are consistent with the constructivist approaches to learning rooted in cognitive psychology: students' vigorous commitment in learning, clear organization of content, and participation in intricate activities (Caine & Caine, 1997; Jensen, 2000; Scherer, 2000).

7. While researchers endeavour to outline teaching strategies that are most effective in supporting student learning, such lists characteristically contain the activities required for finding and solving problems. For instance, generally conservative William Bennett (1986) incorporated the use of experiments in his list of "What Works," along with more traditional strategies such as direct instruction and homework. Marzano (2003) attempted to synthesize multiple meta-analyses of effective instructional strategies into nine

categories of effective practice. One those is 'generating and testing hypotheses' (p. 83). For instance, his "nonlinguistic representations" category (p, 82) includes visual imagery and role play. The category of "identifying similarities and differences" (p. 82) includes the use of metaphors and analogies.

8. Merely stated, if we want to teach effectively, the strategies that sustain creativity will aid us do so. Giving students opportunities to be creative requires allowing them to find and solve problems and communicate ideas in novel and appropriate ways. Learning takes place best when learners are involved in setting and meeting goals and tying information to their experiences in exceptional ways. Students develop expertise by being engrossed in problems of a discipline. Creativity aside, we know that raising questions, solving problems, tying information to personal and original ideas, and communicating results all help students learn. How much better it is, then, to find and solve problems in ways that facilitate original ideas, and to give students tools for communicating novel thinking. Structuring teaching around the goals of creativity is a magnificent two-for-one sale—pay the right price for the learning and you may get creativity free.
9. We have been taught that creativity can be employed for good or evil, in ways both large and small. We celebrate attractive art and discoveries that let us to live healthier and more creative lives. Yet it is possible to use creative thought to devise new and original ways to do terrible things. As with all kinds of education, teaching for creativity demands a context of shared human values. Teaching about and for creativity brings with it the responsibility to discuss the ways new ideas bring joy and benefit to others in our collective community.
10. According to Bowers (1995) it is concerned that in our efforts to assist students articulate their individual thoughts and plan individual actions, we risk undermining their sense of responsible self-questioning and care for their community.

He calls for a view of creativity that is not centered in individuals, but in a part-whole relationship between individuals and community. Though

creativity would be aimed not at individual self-expression or accomplishment, it would be at the well-being of society and the environment.

11. Creativity aims for an effective balance of searching (to find old ideas) and imagining (to invent new ideas) so we can combine the best of old and new ideas.
12. Creativity can arise from a combination of conscious thinking and the unconscious thinking that occurs during a non-working period of incubation.
13. This is very thorough, is worth exploring, and is useful for getting a comprehensive overview of the field.

4. Methods or strategies for creative thinking skills

To assist individuals in generating original ideas, many methods or techniques even sometimes called tools for creative thinking, have been designed. Possibly use of the techniques develops attitudes or habits of mind that make possible creativity: self-determination in verdict willingness to explore multiple options, and perseverance beyond the primary idea. In any case, awareness with techniques designed to improve creative thinking gives individuals a set of tools to use in their exploratory behaviour. Instead of sitting and waiting for the muse to strike, students can use deliberate strategies to channel their thoughts in new directions.

It is not always sufficient to have tools, however. As Mr. Brown discovered, practice with creative thinking skills does not mechanically consequence in the transfer of such skills to other circumstances. Teachers must teach students the general techniques that involve them: how to use them, when to use them, and under what circumstances they might be useful. Using techniques in various circumstances and discussing their application elsewhere can enhance the possibility that they will be seen in life's dilemmas.

As we, the teachers, read, consider which strategies fit most smoothly with the content we teach and the developmental level of the students. Although many techniques, such as brainstorming, can be used at almost any level, others, such as some of the more sophisticated uses of metaphor, are best for students with more highly developed abstract thinking abilities. Only the teacher can determine which ideas are best for his or her students, how they can be adapted, and which areas of the students' lives may provide the best opportunities for transfer.

The following are the major methods or strategies for creative thinking skills which are designed to help generate new ideas. These techniques describe how they work and how they might be used with students. They also offer suggestions for helping students transfer the techniques from classroom exercises to real-life habits of mind.

4.1 Visualization and creative dramatics

Both these techniques involve bringing ideas to life, one in the imagination and the other in physical activity.

4.1.1. Visualization

Visualization plays a crucial role in creating mental images of something that cannot be seen or does not exist. If the teacher says, "Picture your bedroom," the students probably can easily conjure up a suitable mental image, even if they are not in their bedroom right now. If the teacher asks the students to picture their bedroom in the home in which they grew up, it is likely that it, too, will be a clear image. In fact, for many of us, that image probably is laden with emotion. For the fortunate among us, picturing home brings feelings of love and security. For others, the emotions are much more painful. In either case, a mental image of home demonstrates one characteristic of visualization: Clear visual images are frequently accompanied by powerful corresponding emotions. This combination can make visualization a potent learning tool, but one that must be used with caution and sensitivity.

To reinforce course content visualization can be used. Students will need previous knowledge and careful guidance if their images are to increase their content knowledge effectively. Visualization assisted in this way is sometimes called *guided imagery*. To be most effective in stimulating this type of visualization, the teacher should have a script, written or mental, of the images to be portrayed. When the teacher guides them through the content, students can be encouraged to sit in a comfortable position, usually with their eyes covered or closed. The descriptions and suggestions should be presented slowly and clearly, with time approved for students' images to develop.

Guided imagery and visualization, of course, also can be used to guess things that do not exist. By using the SCAMPER acronym, Eberle (1977) provided a series of visual images that were created. In one piece, students picture doughnuts filled with various substances stretching into various shapes and enlarging to the size of a house. A

strong image has them jumping into a swimming pool filled with applesauce in the middle of a giant doughnut. That portion of the experience is invariably met by giggles and squirms. Teachers can guide students to picture an fantasy trip in a hot-air balloon, a tour through an enormous strawberry *(echoingjames and the Giant Peach* [Dahl, 1961]), or a trip to a distant planet. These types of images can encourage artwork creative writing, or discussions of literary forms such as science fiction.

Bagley (1987) recommended that imagery also can be used in creative problem solving. It might encourage random associations, metaphors, or innovative perspectives on the problem. One task involves visualizing the difficulty in a past era. Another asks participants to visualize aspects of the situation enacted by an animal. The visualization, in each case, is used to activate new ideas and points of view.

Finke's (1990) one of the more interesting results of research was that subjects, generally college undergraduates, were more successful at devising creative inventions when the task was somewhat restricted. Subjects given a large range of shapes from which to create any creation were less creative in their responses than those given a limited number of images from which to work and a particular category of object to create. Surprisingly, subjects also had more original ideas when they generated a pre inventive form combining images into an interesting and potentially useful shape before identifying the category of object to be devised instead of trying to sketch a form to suit a particular division.

Doing research with variations on Finke's (1990) techniques with younger students would be fascinating. They could be given specific geometric forms to visualize, control mentally, and use to create new ideas for inventions. It also may be useful to consider if the notion of controlled tasks could be precious in teaching other creative thinking techniques.

4.1.2 Creative Dramatics

Students are asked to explore ideas with their bodies as well as their minds in creative dramatics. These exercises can be valuable for developing concentration, sensory awareness, self-control, empathetic understanding, and a sense of humour. Students, in creative dramatics, have the opportunity to be someone or something else in a safe and accepting situation (Heinig, 1992; McCaslin, 1999).

A situation physically in an effort to find and express creative ideas is explored by the students who involved in creative dramatics. At times, this may involve the types of problem-solving activities and exploration of issues described in the discussion of role playing. Creative dramatics can be seen to include such activities. However, it also includes explorations of less pragmatic situations and investigations of animals or objects. Students, in role play, naturally take on fairly realistic roles to solve a problem. Students can become melting snow, stalking animals, or the walls of a building are some of the fantasies of creative dramatics.

Creative dramatics activities can be classified into three stages.

They are:

- warm-up,
- dramatic activities, and
- debriefing.

Warm-up exercises are used to warm up both brain and body. Warm-ups can include the following:

Mirrors: Each student requires a partner. One person becomes a mirror, reflecting each movement the partner makes. Mirrors work most easily with slow, smooth movements. Occasionally students may be focused to switch roles without troublemaking the flow of the movement.

Relaxing: Students lie on the floor and relax one group of muscles at a time.

Stretching: Students draw out all their muscles from the head down. Students should be cued to draw out as many muscles separately as possible.

Walking: Students walk in place under a variety of circumstances: through the jungle, on hot sand or going to school when their homework is not done.

Catch: Students play catch with a variety of imaginary balls. They should try switching from a softball to a beach ball to a bowling ball.

Dramatic activities may include movement exercises, sensory-awareness exercises, pantomime, and other forms of storytelling.

Movement exercises are designed primarily to aid the students gain command of their bodies and become aware of how their bodies move. Other movement activities could include the following:

Animals: Students mimic animals' movements and mannerisms. Secondary students may develop human characters based on some aspect of the chosen animal.

Puppets: Students feign to be pulled by strings connected to various parts of their bodies.

Tug-of-war: Students are separated into teams pulling an imaginary rope over an imaginary line.

Sensory-awareness exercises are the exercises which are precisely designed to boost students' awareness of their five senses. The teacher may ask his or her students to eat imaginary food, listen to imaginary sounds, or feel imaginary textures. He may find that limiting one of the senses can enhance the others. The prospect for students to sense a variety of textures while they are wearing blindfolds may sharpen their skill to imagine other textures.

Pantomime and other forms of story making activities

With or without the use of dialogue the students are asked to use their bodies to portray situations. These may range from simple activities, such as pantomiming someone using a common household tool, to complex problem-solving scenarios. More complex dramatic activities may require a planning phase as well as an acting stage.

Debriefing

A debriefing discussion enhances the most creative dramatics activities. Students may talk about what they did, how it felt, what worked, what did not, and what they might try another time. These discussions make it clear that creative dramatics activities, although enjoyable, are not part of recess. They are kinaesthetic activities that can bring insight into a variety of situations.

4.2 Incubation Model

It is a kind of strategy designed by Torrance and Safter's (1990, 1999) where a general design for teaching creative thinking that takes into account both the rational cognitive processes that can enhance creative thinking and the "supranational" processes that may underlie moments of "insight, intuition, revelation". Students mainly use information and creative thinking skills to draw conclusions, solve problems, or consider alternatives. Torrance and Safter (1990) illustrated the creative process as a method of probing for information or solutions.

> A person must first become aware of gaps in knowledge, disharmonies, or problems calling for new solutions in order to learn creatively. He or she must then look for information relating to the absent elements or difficulties, trying to spot the complexity or gap in knowledge. Next he must search for solutions, creating guesses or approximations, formulating hypotheses, thinking of possibilities, and predicting. Then comes the testing, modifying, retesting, and perfecting of the hypotheses or other creative products. Then there is the important process of perplexing out, mulling it over, fitting the pieces together- incubation. Finally we can find the communication of results (p. 13).

The objective of their model is to offer students with experiences that will give confidence to them to identify problems or gaps in knowledge, think about them in new ways, and take time for incubation.

The incubation model of teaching considers the types of activities that will enhance a person's creative thinking before, during, and after a lesson. This model is illustrated in the following grounds vividly.

The first stage of this model is heightening anticipation. The aim of this stage is to "heighten anticipation and expectations and to prepare the learners to make clear connections between what they are expected to learn and something meaningful in their lives" (Torrance & Safter, 1990, p. 7). This stage may be thought of as a warm-up process, piquing students' attention and tying to use prior knowledge. It might include activities that ask students to look at the same information from different viewpoints, respond to a provocative question, become aware of a future problem, or make predictions. In each case, the aim of the activity is to produce students' curiosity, focus their attention, and provide them purpose and motivation for the activities to follow.

The second stage in this model is called deepening expectations. This stage, which might be considered the body of the lesson, requires learners to process new information and address the puzzling situations raised in stage 1. Students may be asked to collect information, re evaluate results, process familiar information in new ways, or identify important data.

Finally, in the third stage, it is considered going beyond. Students, in this stage, are asked to do something with the information and skills they have met before. They may give personal meaning to the situation, make calculations for the future, use information in fantasy, or solve real problems. Activities may extend over a period of days, allowing time for incubation.

Torrance and Safter (1990) suggested various examples of strategies that may be appropriate for each stage. One of the examples of them will demonstrate how the model can be used from primary grades to high school.

One model lesson teaches high school students concerning the Kwakiutl people. The creativity purpose is elaboration. In stage 1, students are presented with information on the Kwakiutl practice of presenting their rivals with so much wealth the rival can never repay it. They are asked the following questions (Torrance & Safter, 1990, p. 59);

1. What clarifications would the Kwakiutl offer for this practice?
2. What else do you require to identify before you can get a obvious picture?
3. Write the movies which prompt these actions.
4. What pictures of these people appear from knowledge of this practice?

In stage 2, pupils study information about the Kwakiutl culture. After reading, they may role play conflict situations, write a dramatization of Kwakiutl life, or list questions they would like to investigate to understand the Kwakiutl better. In stage 3, students' questions, comments, and understandings are discussed, and then compared with the writings of anthropologists who have lived with the Kwakiutl. Students' information may be reorganized to accommodate the new insights.

4.3. Metaphors and analogies

Metaphors and analogies are the most powerful tools in teaching creative thinking skills. The immense benefit of metaphors is that they simplify; each economic metaphor above touches on an important aspect by analogy. Their use can also be considered a mechanism for divergent thinking because it can produce many varied ideas, but it generally is focused more on the types of ideas produced than on the number. In analogical thinking, ideas from one context are transferred to another in a search for parallels, insights, fresh perspectives, or new syntheses.

Metaphors also can play an important role in problem solving and scientific discovery.

4.3.1 Synaptic

According to Gordon Synectics is a creative word coined to mean "the amalgamation jointly of different and apparently irrelevant elements" (Gordon, 1981, p. 5). Methods of Synectic are metaphor- or analogy-based techniques for bringing elements together in a search for new ideas or solutions. Businesses, think tanks, and research organizations have used them and have been the impetus behind the ideas for Pringles potato chips, magnesium- impregnated bandages, disposable diapers, and a host of other innovations.

For in a series of workbooks and curriculum development guides, teachers and students have adapted Synectic ideas (Gordon & Poze, 1972, 1975, 1979, 1981, 1984).

In the words of Prince (1968, p. 4), the essential processes of synectics are "making die strange familiar" and "making the familiar strange". To make the strange familiar, the innovator combines something familiar with a new problem or situation to solve the problem or come to an understanding. To make the familiar strange, he also combines something new or strange with something familiar, this time to gain new insights into or perspectives on the already familiar idea. The creation of various types of analogies is facilitated through these two processes.

4.3.2 Direct Analogies

The simplest type of comparison is direct analogies. In a direct analogy, individuals look for parallels between one idea, object, or situation and another. Learning to make direct analogies students first start with simple comparisons between similar objects and progress to more abstract processes. Early comparisons might examine how a bird is like an airplane or how a kite is like a balloon. Opening comparisons are most likely to be successful if they are based on clear similarities in either form or function. Even young students likely can see physical similarities between a tree and a hat rack or functional similarities between a campfire and a stove. If students first practice describing the connections in an analogy selected by someone else before they begin to create their own, they will be most successful. Students should have the opportunities like how a comb and rake are alike before being asked, “What things are

like comb?" to identify the connections and similarities in such activities. To carry out metaphorical thinking or to process important curricular ideas, students can make these comparisons as exercises. Students can process content at complex levels of thinking and teachers can achieve insight into students' understanding of key ideas by discussing student-generated analogies about content.

Direct analogies also are prominent tools for creating visual images. Direct analogies can be made between emotions and a variety of objects: a warped ribbon to indicate laziness or a broken mirror glued over a photograph to imply curiosity. Roukes (1982) suggested for one activity that such items be collected and displayed in a small box with many compartments to create an emotion box (p. 68). Other projects use strategies ranging from personal analogies to magnification, combination, and distortion to stimulate new points of view in the visual arts.

4.3.3 Compressed Conflicts

Compressed conflicts, or symbolic analogies, bring together words that express completely different ideas. In a technique significant of Rothenberg's (1990) janusian process, they force the user to consider two opposite ideas at the same time. Sometimes diese juxtapositions may be literal antonyms, such as big small or beautiful ugly. Other times they may state more complex or oblique yet conflicting relationships, such as disgraceful hero or sovereign disciple. Compressed conflicts regularly have broad, conceptual applications and can be used to many mixed situations. The level of concept they involve makes compressed conflicts most suitable for students in later elementary grades and above.

4.3.4 Using Synectics

The synectics processes offer dominant tools for generating and using analogies, but there are undoubtedly occasions when the teacher may wish to help students employ analogical thinking in other ways. In particular, experiences in metaphorical or analogical thinking can aid students create ideas and form for creative expression.

4.3.5 Personal Analogies

Students are asked to be the thing for personal analogies. The amount of experience students have had with personal analogies, as well as their developmental level, will affect their depth of connection and empathetic involvement in the analogies they create. The greater the conceptual distance between the person and the analogy, the

more difficult it is for him or her to reach empathetic involvement, but the greater the likelihood that the analogy will lead the person to new ideas.

Personal analogies can present the bases for class discussions, writing projects, or art activities. Primary school students might be asked to be a letter going through the postal service and to write in their journals about their adventures. Intermediate school students studying simple machines could be asked to discuss what it might be like to be a lever or a pulley. How would they feel as they were used? What might change their feelings? High school students might be asked to create a work of art or a written description of life from the perspective of an electron or a sound wave. Personal analogies can also form the basis for problem solving or design projects. In these analogies, taking on the identity of the object may allow the designer or problem solver to view the situation in new ways.

4.4 Divergent thinking strategies

Many techniques of creative thinking are designed to enhance students' divergent thinking or their ability to think of many different responses to a given situation. The most prevalent meaning of divergent thinking includes: fluency (thinking of many ideas), flexibility (thinking of different divisions or points of view), originality (thinking of unusual ideas), and elaboration (adding detail to improve ideas) (Schlichter, 1986, p. 364). The four crucial areas in this explanation indicate that fluency often is the basis of activities designed to improve divergent thinking. 'Trying to think of ideas that solve the problem in a different way' encourages flexibility. Try to think of something no one else will think of" are designed to elicit originality, whereas 'how can we build on this idea?' encourages elaboration.

Thus, assisting students see how divergent thinking fits into the whole of creative thinking is very important. It is not creativity if divergent thinking alone is employed. Finding a problem or issue worth addressing, generating ideas for addressing it and evaluating the ideas generated all are involved in creativity.

4.4.1 Brainstorming

Brainstorming is probably the most familiar thinking strategy among all the strategies for generating ideas. The process of brainstorming strives for a nonjudgmental helpful mood in which idea production can increase.

Brainstorming can be an appropriate strategy any time a student wishes for a large number of ideas. This occurs most often when he needs to solve a problem or come up with a new, original idea. Students could brainstorm synonyms for an overused word, characteristics for the school newspaper, new endings for a story, options for making a graph, strategies that might have aided a historical figure, options for making a graph, variables for a possible science experiment, or strategies for reducing cafeteria noise.

4.4.2 Scamper

The acronym SCAMPER can be a useful tool for many creative endeavours other than visual imagery as it is easy to remember, it can assist children as well as adults in using the idea-spurring questions that can help them generate diverse ideas.

The S in SCAMPER denotes *substitute.* In each case, a solution or innovation was found by substituting a new material or part for the original one.

The C indicates *combine.* To create interesting visual puns from figures of speech or compound words, combinations could be used. Carpool, a fan belt, or a handspring might be portrayed are some of the examples of this kind. Picasso used this technique to recombine elements of figures or objects that had been taken apart. For new story ideas, characters from diverse literary forms could be combined.

The A stands for *adapt.* To solve the problem, we change something known in adapting. Many computerized communication programmes for individuals without speech began as adaptations of boards that allowed the user to point (or blink) at the desired word.

The M indicates modification. It gives students a set of tools they can use when they are struggling to find an idea or to improve the ideas they have.

The P stands *for put.* Using resalable food storage bags to organize a suitcase, planting flowers in an old wheelbarrow, and recycling plastic milk jugs as part of a stage set all are examples of putting materials to use other than those for which they were planned.

The E is for *eliminate.* In some schools, efforts to lessen cafeteria clamour were eliminated when would-be problem solvers determined that as long as students can hear emergency signals over the cafeteria noise, it may be good for students to talk in

the cafeteria, or that the energy spent trying to keep them from doing so could more profitably be spent in a different place.

The R indicates *rearrange* or *reverse*. Left-handed scissors, knives, and garden tools are examples of rearranging or reversing.

The most crucial understanding is that all or parts of the SCAMPER acronym can be employed any time students need to generate many ideas or solve a problem. They do not have to sit and wait for ideas to explode into their heads, but can use the SCAMPER questions to help the ideas come.

4.5 Commercial and competitive programmes

To enhance creating thinking, a number of commercial programmes and interscholastic competitions considered. Some of the commercial and competitive programmes are:

4.5.1 Future Problem Solving

The aims of the Future Problem Solving (FPS) program are to develop creative and higher level thinking skills via a multistep problem-solving method, to help students develop capabilities to deal with the unknown of the future, to persuade students to make knowledgeable decisions after investigating a variety of resources, to help students develop skills required for teamwork and group procedure, to help students develop skills of organization and coherence in both written and oral communication, to help students become more self-directed, and to help students contend with vagueness (Michigan Future Problem Solving Program, n.d.).

4.5.2 Destination Imagination

Destination Imagination is also a team-based program. Students take part in Destination Imagination in teams of up to seven members who work to answer two different types of challenges: team challenges and instant challenges.

4.5.3 Odyssey of the Mind

It is a competitive program in which teams solve problems. Odyssey of the Mind affiliated with Creative Competitions, a for-profit organization. This kind of approach to learn creativity involves both short and long-term problem solving.

4.5.4 Inventing and Invention Conventions

One of the most fascinating and pleasing ways to learn about creativity is through the invention process. Learning about inventors' experiences and walking in their

footsteps bring students unique insights into the generation and implementation of new ideas. Identifying a problem and inventing something to solve the problem is a powerful assignment for graduate students. The task seems initially intimidating, but it scores of graduate students find success, pride, and renewed faith in their own creativity by tackling this challenge.

4.5.6 Commercial Products, Transfer, and the Real World

To enhance creativity, there are many commercial products and programmes planned. Books, kits, software etc., are some of the examples of this kind. Some are single activities or books focusing on a targeted idea or skill. Others are comprehensive programmes. There has been, most recently, a proliferation of software programmes planned to encourage divergent thinking and help record and organize ideas. If teachers cue students that the skills might shift, the students are more likely to try using them in other situations (Bransford, Sherwood, Vye, & Rieser, 1986; Crammond, Martin, & Shaw, 1990). Using brainstorming to solve class dilemmas is an even more powerful tool for transfer.

5. Conclusion

Teaching creative thinking skills plays an important role both in teaching and learning. 'Creative thinking' reveals the kind of thinking that leads to new insights, new approaches, fresh perspectives, and entire new ways of understanding and conceiving of things. The products of creative thought include some obvious things like music, poetry, dance, dramatic literature, inventions, and technical innovations. As a vehicle for renewing and sustaining communities, the idea of creativity brings a new layer of responsibility for teachers. Many methods or techniques have been designed to assist individuals in generating original ideas. In any case, awareness with techniques designed to improve creative thinking gives individuals a set of tools to use in their exploratory behaviour. Students can use purposeful strategies to channel their thoughts in new directions. Although brainstorming which can be used at almost any level, other sophisticated uses of metaphor, are best for students with more highly developed abstract thinking abilities. The most popular teaching creative skills the teachers use at different levels are visualization and creative dramatics, Torrance and Safter's incubation model, use of analogies, divergent thinking strategies and commercial and competitive programmes.

Teachers consider which strategies fit most smoothly with the content they teach and the developmental level of the students. Hence, the teachers can build strong pillars of the nation by adopting the most appropriate innovative teaching skills at the appropriate levels.

About the Author:

Dr. Nagamurali Eragamreddy works as an assistant professor with the Department of English, the Faculty of Education, Traghen campus of the University of Sebha, Sebha, Libya. His major areas of research interest include- ELT, TEFL, British Literature, American Literature and Indian Literature in English.

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