

The Role of Creativity in Education and Solving Educational Barriers

¹Mahsoome Kandi and ²Mahboobe Kandi

¹Department of Fine Arts, Aliabad Katool Branch, Islamic Azad University, Iran

²Faculty Member of Farhangian University, Nasibe Branch, Iran

Abstract: Different writers define creativity in different ways. This paper explores the different definitions of creativity, the relationship between creativity and intelligence and the influential factors in creativity such as convergent and divergent thinking. The paper includes a combination of very creative college student qualities and offers viewpoints of researchers about techniques of improving intelligence. Although initiative and creative thinking are personal features, guidance and training can increase learners' efficiency significantly. This paper also covers the importance of nurturing creativity by teachers and professors and its obstacles in educational centers.

Keywords: Convergent thinking, creativity, divergent thinking, intelligence

INTRODUCTION

One of the most human's obvious characteristic and his basis of life is his thinking power. The man has never stopped thinking throughout his whole life and has made decisions through his accurate thought and could solve the problems and improve himself. Therefore, all the man's success and progress are due to his fertile and dynamic thought. The most complex and outstanding perspectives of human thought is creative thinking, about which different views exist. The most current researcher's definition of creativity is "making a new and appropriate design". Creativity development relies on different personal and social factors such as intelligence, family and personal characteristics, etc and dominance over different personal and social barriers such as fear of failure and limited rules requires creativity development. Torrens believes a society should develop and use its member's creative thought for its survival. The human's creativity is the most important equipment by which he can eradicate spiritual pressures of daily life and extraordinary events. So, by correct training, it is possible to increase people's potential power of creativity.

One of the effective centers for creative thinking training for people in society is educational environments especially university centers. In many cases, university is the starting point for people's engagement in social activities. Enabling the individuals socially and personally, spreading knowledge and training experts who can have the required scientific and practical qualifications for performing their duties in society are consequences and goals of university training. The individual's entrance in each part of the society and his success has a close relationship with his point of view about the way of

doing the task. For achieving these purposes, the role of creativity cannot be ignored due to the contributions it can make to find different ways of carrying out a task and to find solutions to problems according to circumstances and working situation in which he is. Achieving this goal requires creativity training and the most appropriate educational center is university.

Regarding the importance of creativity in education, the purpose of this paper is to find the relationship between creativity and other factors playing a role in increasing the efficiency of teachers and presenting different ways for solving the existing problems among students.

Definition of creativity: Generally, presenting a complete and accurate definition of creativity which contains all aspects of it, if not impossible, is very difficult. After years of studying and researching about creativity, psychologist and educational experts still have not been successful in presenting a definition of creativity accepted by most practitioners.

From some of the psychologist's view, creativity is the combination of power of creativity, flexibility and sensitivity to ideas which enables the learner to think about different and generative results out of insensible thinking results which leads to personal satisfaction or perhaps other's happiness.

The most current view of creativity is that the individual presents a new and different idea. Creativity can be evaluated by creating a new or different piece of work, but we should have this in mind that every creativity does not essentially lead to a visible piece of work.

From McKinnon's view, creativity is problem solving in a way that it has a new essence. William considers creativity as a skill which can join separate

information, combine the new informational factors in a new way and relate the previous experiences with new information for creating unique and anomalous answers.

However, in studying creativity, two important points should be considered:

The first one is that creativity can be the creation of new forms from old products or ideas. In this case, the previous ideas and thoughts are mainly the basis of new creations. Regarding the second definition, creativity is monopoly and the result of personal efforts and not essentially a general situation. So, possibly it can create something that had no background knowledge about, even if it is possible that the same thing had been created in the similar way or exactly the same by another person in a special situation.

Psychologically, creativity is one of the main aspects of thinking. Creativity requires the utilization of especial stream of thought, which Guilford knows as divergent thinking. There are two kinds of thinking including convergent thinking and divergent thinking. Convergent thinking is the process of rearrangement and refreshing the existing information and the obtained symbols in long term memory. On the other hand, divergent thinking is the process of combination and redecoration of the existing information and obtained symbols in long term memory. Creativity is regarded as divergent thinking.

The relationship between creativity and intelligence:

The view that the clever the individual, the more creative he/she is, is not correct. According to Rios and Clark (2006, as cited in Fallah Tafti, 2009), all the existing creativity tests emphasize the relationship between creativity and intelligence. They never say there exists another factor or basically helps another. Most of (IQ) tests, measure divergent thinking. These kinds of tests force the college students to use the things they have learned about new problems or to extract some rules from the previous expanded examples. Even the most popular creativity tests are to some extent invalid due to the subjective nature of the factors they measure and lack of predetermined correct responses (Rios and Clark, *ibid*).

Main characteristics of very creative college students:

Creative college students show special features which distinguish them from their counterparts. These features can be increased by computer technology and hypermedia, especially by the more usage of pictures instead of text for meaning transmission and communication (Marsh, 2002, as cited in Seid Javadin (2008)). Some of these characteristics include the following:

Initiative: It is the power of producing unusual new thought for solving problems in an unusual way and

also it is the usage of factors and situations in an unusual way. Creative college students who are not sure about traditional beliefs are willing to do dangerous thoughts with creative discovery. But, it is unlikely that initiative alone could be able to create creativity. Because initiative also needs to be combined with other factors. Among these factors, the existence of a powerful culture, highbrow minds, sensitivity to forms, sequential engagement of logical thoughts, learning special professional skills such as writing, engineering, architecture, painting, music or even the temperament of emotional wondering experience can be mentioned (Kanatala, 2004, as cited in Fallah Tafti (2009)).

Perseverance: Creative college students are those who have perseverance, are willing to do a special task if it is necessary and work in an unpleasant situation. The most important of all is that they are willing to face failure. It seems that deprivations give them the motivation for further efforts (McKinnon, 2005, as cited in Seid Javadin (2008)).

Independence: Creative college students are independent thinkers who are looking for unusual and undiscovered things. These people pay attention to things such as color, texture and personal reactions to which other people do not. Mostly, these people discover them only to see what will be the result of new thoughts. Unlike whip crackers who make fun of tradition just for the reason that they feel they must be different, our independent thinkers make a balance between adaptation and disagreement. Unlike whip crackers, independent thinkers accept experiences and trust their new thoughts but they are often the rudest critics of themselves (Samuels, 2004, as cited in Seid Javadin (2008)).

Involvement and detachment: When a problem is recognized, creative college students will be merged with it. First, they search how others have tried to solve it and they get familiar with its problems and complexities. In this way, such an engagement in the problem makes the situation ready for their activities. Creative college students resign the problem very soon to see its general view. Creative students resign work temporarily for the new thoughts to have the freedom to emerge.

Delay and rush: Creative college students are willing not to accept early judgments. They do not accept the first situation. But, they wait to see whether there is a better situation or not. It seems this delay for judgment is the characteristics of an open-mind person. A person who is not willing to make imperfect decisions.

The latency or dormancy period: Creative college students resign the problem temporarily and allow their

unconscious mind to overcome, to make different links and connections which conscious mind is not able to. Dormancy period maybe short or long but should lead to a result. This intentional resting period allows the brain to operate freely (Rios and Clark, 2006, as cited in Fallah Tafti (2009)).

Creative college students may suddenly solve the problem after the long period of neutral effort. This sudden spark of insight is the result of inner pressures of unconscious mind and maybe for this reason that whenever the brain works freely and automatically, the unity of forces increases. Usually, this spark occurs after a dormancy period and when individuals do not follow the problem actively. A Japanese inventor says that his most creative thought occur when he forces himself to dive into his pool until there is no oxygen in his lungs. (Rios and Clark, Year, *ibid*)

Confirmation (survey of accuracy or indisposition):

Even though observation or direct realization provides the required motivation and paves the way for problem solving, but problem verification should be investigated in an observable unusual way. A correct judgment should complete the task which imagination has started. Activating imagination makes the mind touch the underlying layers of spirit and it stimulates positive feelings and satisfaction. The spark of inner insight just like a stimulator operates to make the creative person free from a limited approach to the problem, sometimes an inspiration spark is the reason for the speeding up of other inspirations.

Discovery: Not too far ago, most studies were focused on creativity to solve the creative behavior. It is obvious that divergent thinker solves the problem differently from convergent thinker. But the question that how a divergent thinker or a creative thinker solves the problems have not received much attention. Is this a process of finding a new solution to old problem? Or most likely is it finding a new solution to new problem which the creative individual has discovered? On the basis of three decades of research, Getzels and Jackson (1962) believe that the way by which the creative person solves the problem is the basis of research. They identified three problem situations in which they give the learner both the problem and its solution. For example, the first situation is finding the area of a rectangle in which they ask the individual to multiply side a with side b. in the second situation, they give the learner a problem but they do not give it is solution. For example, they say “find the area of this rectangle”. In this case, the individual should solve the problem by reasoning and analysis. In the third situation, the neither give the learner the problem, nor the solution. For example, they say how many important questions can you ask about a rectangle? In this case, the person who solves the problem should find the problem. Whenever

all the problems are put in the frame of rules, it is the time to find solutions. Getzels and Jackson (1962) believe, many of the learners who are potentially creative, prefer to work on problems which they have found themselves. Other learners may work more freely in organized situations. Creative college students have been ignored a lot in our educational institutes. Kantala (2004, as cited in Fallah Tafti (2009)) mentioned that problem solving, realization power, aesthetic experience, observation or direct realization, visual analysis, imagination and experiment are essential factors for the increase and progress of creative behavior.

Creating superseded solutions: One of the main characteristics of creative thinking is finding different ways for observing problems. In convergent or logical thinking, the individual stops finding other solutions after some proposed approaches and selects one solution as the ultimate one. All of the insensible or unachievable approaches are immediately bypassed. But, in creative thinking, the individual intentionally tries to find every possible solution. During this process, the certain solution that have been obtained earlier will be confirmed and will be bypassed until the next referral and creating superseded solutions will be continued. Unlike convergent thinking, here the probable, strange or very illogical solutions are also accepted experimentally and without evaluation. Evaluation will be done later. Basically, here, the goal is delaying ultimate decisions through loosening the fixed thinking patterns. Most problems can be solved in different ways. Even if a logical approach seems appropriate, there is no guarantee that it is the best solution. Superseded solutions enable the individuals to consider other probabilities which seemed ineligible in the first place (Osborn, 2000, as cited in Samkhanian *et al.* (2002)

Porkinsy, Harvard’s university professor, proposed the theory of snowflake pattern of creativity by studying laboratory information and studying the biography of creative people. Porkinsy’s pattern includes six related and also distinct behavioral characteristics which exists in creative people.

He believes that it is possible that creative people do not have all these six characteristics together, but seemingly the one who has the more numbers of these characteristics, is more creative.

Great interest in discipline: It means high tendency to simplifying and creating discipline and meaning to whatever that seems garbled and unorganized.

Problem planning: By making questions and searching for correct problem, the creative people can identify the borders of their specific course and find the possibility or impossibility of its spread.

Mental activity: Mental activity gives the creative people the opportunity to have a new view to problems. In order to come to a conclusion, creative people consider the opposite and contradictory points together. They often think in an analogy framework and in reality they fight with the existing hypothesis.

Inner motivation: Creative people do the works for enjoyment and satisfaction and they like the effort they make for doing that.

Influential factors in creativity: The theorists of pedagogical, psychological, behaviorism and clinical sciences have tried to create a logical and stable connection between the influential factors in creativity and training creativity by proposing different theories.

Renzuli (1999, as cited in Fontana, 2003), in a study, mentions three elements as the influential factors in training creativity: teachers, college students and curriculum. So, he considers the operation of university as the most important.

Getzels and Jackson (1962) in their studies believe that one of the basic factors in training college student's creativity is the view point of their professors to creativity and creative college students. They believe creative college students are less obedient and have less coordination with group and their behavior is unpredictable. Because of that, some of the professors think that they are trouble-makers. They consider the following five principles including paying attention to their questions, paying attention to their fantasy, letting them know that their beliefs are valuable, doing work for the work itself without being evaluated and doing evaluation with reasoning and logical conclusion as the important factors in training creativity of college students.

Amabill (1990, as cited in Fontana, 2003) in his study identifies the modeling rule of professors and free expression of feelings such as love and happiness, curiosity in different tasks, creating a positive environment in the classroom, having an amicable relationship with love and respect, the authority of human relations in the classroom, giving the students the opportunity and independence as the most significant factors in training creativity of college students.

Vales (2003, as cited in Seid Javadin, 2008) have shown that in creative classrooms, thought is more valuable than memory. And he believes that creativity factor is the balance between psychological security and student's freedom for risk taking.

Veilings (1994, as cited in Seid Javadin (2008)) in another study, considers the three factors of subject, teaching methods and divergent thinking skills as the elements in training creativity. This study fills the gap and distance between cognitive and emotional learning.

Rowan (2003, as cited in Seid Javadin (2008)) contends that the creativity is the basis of competition

in word marketing. He believes that creativity emergence has a close relationship with family situation. In another way, he believes creativity can be increased by creating a suitable family situation.

Germany (2002), America (1980), France (2000), England (1999) separately have done researches on the ways of nurturing creativity of military university college students. Results showed that the most important factors in student's creativity include training creativity, the educational content, culture, the social relationship between student's family, professors, organizational environment and learner's effort.

Influential factors on creativity in educational environments: Several factors affect the student's creativity in school environment which in a general classification can be divided into the regnant atmosphere of the school, content, teaching materials and the teacher.

- **Regnant atmosphere of the school:** John Dewey, the great thinker of educational matters, believes that school should encourage student's automaticity. The school's basis should not be just obedience and subordination and does not consider the rules as the basic point so that the student can develop his creativity. However, nowadays, the main problem of schools is that not only they do not encourage learners' creative thoughts just for being unusual, but also they criticize them. Blaming students just for having unusual behavior and thoughts can ruin their creative thoughts and their power of discovering new problems in the first days of school.

If we want to develop student's creativity and let their potentials emerge, we should have a revision on the regnant atmosphere of the school. For example, we cannot expect students not to move, to follow a same pattern in sitting, speaking and clothing, to give an answer which is the only correct answer just from the teacher's viewpoint and to be creative at the same time. Of course, it does not mean that there should be chaos in the school because discipline is the basis for every training. The goal is having a flexible discipline. It means discipline should be concerned with general matters and does not affect the details of behavior and speech.

If school has a suitable and supportive atmosphere instead of inflexible and aggressive atmosphere, not only the teacher can present new and effective models with safety and relief, but also the students can do creative activities with self confidence and psychological safety.

- **Content and teaching materials:** One of the issues in the world today which is greatly focused

is learning how “to think” and how to “learn”, not “what to learn”. Sometimes paying too much attention to “what to learn” causes the student’s mind to be filled with too much concept quantitatively. We give them too many fishes so that they are forced to pour out the surplus. So, they do not pay attention to the learning and its benefit for their current and future life. According to these points, paying attention to some points is necessary for planning the content and teaching materials as follows:

Having an emotional and cognitive link with the curriculum: Students learn the content of a curriculum when that content has conformity with their capabilities. The content can be learned when it is selected according to the background knowledge and personal differences of the students. If so, there will be a cognitive link between the student and the content.

A suitable opportunity for multiple learning activities: Creating learning opportunities are defining the kind of learning atmosphere by which students achieve a range of meaning and concept. The presented learning opportunities should create the backgrounds for student’s Self-reliance and self-learning. It should be pointed out that the content should not focus on theoretical knowledge, but on activities and skills which make students spiritually ready for learning, seems necessary.

The connection of class environment with content and principles: In planning the content, the characteristics and the situation of the classroom environment should be focused exactly by the planner. Adequate budget and time should be allocated for suitable performing of perfect plan.

The connection of teaching materials with content: Nowadays, in curriculum planning, educational packages such as books, books used as teaching aids, teaching materials, evaluative questions, teaching guides are considered all together. In many books positive evolutions are occurring and some of the TV programs are trying to take step along with educational program. But, it should be mentioned that along with the evolution of books and generally educational packages (these educational packages should be given to all schools) teachers also should gain the necessary skill and readiness for presenting perfect content, as a good and creative presenting is successful when it is performed. It is not possible to teach the lessons which were planned for active teaching patterns by traditional and teacher centered method and expect success.

- **The teacher:** In the process of teaching and learning and creative thinking in students, teachers

have the main rule. Teacher’s creativity, his opinion toward creativity, his teaching technique, his way of controlling the class and even his personality have great influence on creating critical thinking and creative thinking. In fact, the most effective and efficient element of teaching and learning is the teacher. It does not mean that other elements of teaching and learning such as curriculum, management, etc are not influential. But, firstly, the effectiveness of these options is not equal to the teacher and secondly this effectiveness is not direct and finally affects the students by passing the teacher who is the combination of mentalities, attitudes and capabilities

As said before, the teacher is affective in developing students’ creativity from different aspects. Because of that, these aspects are taken into account for more discussion as follow:

- **Teacher’s attitude:** Teacher’s attitude and view have an important role in developing students’ creativity. Most teachers are satisfied with the student who is compatible, social, courteous, obedient and self-restrained. But as creative students ask various questions, have extraordinary imagination power, do not adapt themselves with group, are often trouble makers and generally their behavior is not predictable, are not welcomed by the teachers

On the basis of Getzels and Jackson (1962) finding, the students who have a higher degree of divergent thinking are less favored by teachers than convergent thinkers. Maybe divergent thoughts are often valuable and creative. On the other hand, they may seem strange and fool and they cause the teacher to think that this child wants to make fun of something. As the result of this perception, not only initiative is not welcomed, but also is ruined. Brunner also says teachers usually reward correct answers and punish incorrect ones. This causes the children not to have tendency for finding new answer because without any doubt by doing that error’s possibility real increased. The teacher should be ready to work in an environment in which creative efforts are encouraged and rewarded, not in an environment in which just wary and convergent solutions are encouraged.

- **The modeling role of the teacher:** Arthur Katen and Robert Bisand believe that teachers showing a creative behavior create a classroom environment which increases creativity. In addition, Amobil (1989, as cited in Afroz (1994)) believe that teachers can be a good model for children by free expression of their feelings such as live, happiness and curiosity. In fact, a creative teacher

automatically makes his students creative. It means he transfers his mood, feelings, emotions and motivation to students. In reality, even if the teacher does not transfer these properties to the student, the student himself receives these positive feelings from the teacher and maybe the transmission of such characteristics from the teacher is rooted from spiritual transmission. So either conscious or unconscious, this ability causes the development of students' creativity. Of course, it does not mean that teachers, who are not creative, cannot encourage creativity in students. But, each teacher can try to explore creativity of students and create opportunities for its occurrence.

- **The emotional role of the teacher:** Creating suitable situation for creativity development depends on the existence of amicable and safe atmosphere in the classroom. Strict and disciplined teachers, who encourage students for correct sitting on the straight line of benches and to keep their feet firmly on the ground, ruin the students' creativity by forcing them to obey the rules and punishing the mistakes of a child who wants to achieve unknowns. By ignoring or not answering the questions, they ruin the pleasant orientation of children's questioning. According to what has been said, the educational system will be successful in developing creativity in students and developing efficient and creative workforce in society when it takes steps for overcoming barriers in the way of developing creativity with all cultural power and economical facilities.

Creativity can be increased by making a group which accepts and encourages new thoughts. These thoughts can be measured on the basis of their qualifications. It should be said that most of creative thinking achievement which are introduced for the first time, seemed like a revolution (Brat, 1985, *ibid*).

It is suggested that trainers locate the students in situations free from hypothesis or existing facts and make them find the information themselves (Long Ester, 2000, as cited in Fallah Tafti (2009)). Most important of all, independence is the necessity in creativity (Ericson, 2004, *ibid*). Sometimes, college students should be let free to work on the projects, make mistakes, play with new thoughts and follow guesses which do not seem successful at first glance. Instead, they should be encouraged to evaluate the result of such efforts themselves. Curiosity gives the individuals the motivation for analyzing the matters which others consider them obvious. With continuous survey through questions such as "what will happen if...?" curiosity can be increased (Intoistol and Hansel, 2005, as cited in Fallah Tafti (2009)). Maybe, the main barriers on the way of creativity are the traditional university professors (Milton, 2002, as cited in Fallah

Tafti (2009)). New thoughts which tend to "erupt" every moment, often make teachers surprise (Kroch Field, 1993, *ibid*). Most of the time, trainers consider this behavior as student's impudence or as a criticism to their teaching method (Lafochi and Rikter, 2000, as cited in Fallah Tafti (2009)). In fact, such behavior just reflects the "immediate" new thought (brainstorming) of the person. Such an immediate egression of new thoughts can be encouraged. In a way that allow the individual (or the participated group) to find a design to implement this thought. Poor planning can destroy the great creative power. Usually the university students tend to postpone doing their projects till the last moments. When they start, they should quickly go on. Probably, they borrow many of the existing resources. They put aside every new thought that may emerge for time saving. Although there is no fixed pattern for activating creativity, Osborn (2000, as cited in Fallah Tafti (2009)) proposes some strategies which many of the creative people consider them as effective.

Anecdotes are also great resources for producing superseded solutions. Especially when these anecdotes are about different people or animals (Debone, 1990, as cited in Fallah Tafti (2009)). Here the homework is asking the ideas about each characteristics of the story. Kimball (2000, as cited in Fallah Tafti (2009)) describes it by an example: a boy and his dog are looking at a squirrel on the tree. There are a man and a woman in the background. Describe what will happen from the boy, dog, squirrel, man and woman's view. The diversity of answers is used to show the perceptual differences. Just for the change in the significance given to the facts and not to the significance of the facts themselves, a desirable description may change to an undesirable one. Although these techniques are more used for elementary school students, there may be ways in which professors modulate these findings and increase creativity in other educational environments.

In solving problems, we should start with defaults. These defaults are every new thought, fact or principle which seem obvious. They are the fundamental structure of problem solving. Unfortunately, they create such limitations for making problems smaller. But if one or more numbers of these defaults were incorrect, the final solution would be incorrect too. Most of these defaults have been transferred through traditions. Challenging them may be considered unfair, desecration of sanctities or pure stupidity. For many years, the provable incorrect defaults were known as suspicion. For example, once upon a time, they considered tomato poisonous. For many years, they have disagreed about studying human body by researchers, because they knew the anatomy of human body as blasphemy. By focusing on mistakes in written exercises, the professors often decrease creativity. It is better to focus on what has been done well, to point to the incorrect reasons later and let the students do the

duty of finding mistakes themselves. The students can do more exercises with more validity and accuracy (Eble, 1996, as cited in Gomez (2007)).

Ways of creating creativity by the teacher: During fifteen years of experience in studying and teaching creative thinking, Tones have seen evidences which show creativity can be trained.

From Karle Roger's viewpoint, creativity cannot be created by force but it should be allowed to emerge like the farmer who cannot bring out the grain of the sprouts but can create suitable situation for the growth of the grain.

The teacher can provide the basis for creativity development by applying good methods such as the followings:

The use of contradictions: presenting contents which are against traditional, general and scientific beliefs. For example, in lesson of experimental science, the teacher asks the students to reject the old theories and motivates the students to evaluate the things and find interesting ways for testing and proving problems.

The use of examples: the teacher helps the students to achieve information, facts and new principles in the same situation by using what they have known so far. To show them how scientific products are formed on the basis of similar situations. It is also important to encourage them to study the biography of creative people.

Focusing on deficiencies and gaps in knowledge: to ask students to explore what has been remained unknown to human instead of what is known to human. To develop students' skills for finding gaps and unknowns. The teacher should ask students to find all the possible definitions and also rejecting reasons of a problem.

Picture: using pictures is another useful way for creating superseded solutions. Students are asked to describe what is happening in the picture. So, they use different description to show other ways of seeing objects. According to Dibono, description has different levels including what we see, what will happen later, what has been happen, what will happen very soon and so on. He suggests that teachers determine free homework first but later they ask for more specific descriptions.

Reinforcing thoughts about facilities and probabilities: to create opportunities for answering to questions such as how, if or in what ways and even he should be forced to answer them. The students should understand how an item leads to another. The time for thinking about different ways of solving the problem should be given the students when giving them the question.

The use of stimulative question: The teacher should focus on questionable propositions which need a deeper understanding and use questions which need translation, interpretation, definition, exploration and analysis and creating opportunities for students to search the secrets of things.

Enhancing student's interaction with previous information: Creating opportunities for students to use the information they have and to help them and to give them opportunities the experience things by using the facts and information they have learned.

Enhancing creative studying skills: To ask students to say the beliefs they have gained as the result of studying instead of what they have studied.

Creating ambiguity and its enhancement: All people know that students learn when they are successful in solving the problem. So, the teacher should start the learning situation by telling a point and then stops and lets students use and engage in the information themselves. This is a good way which leads to self-guiding learning.

The use of exploratory method: In exploratory method, the student himself looks for the solution and the teacher has a guiding rule. In this method, the way of finding the answer is more important than the answer itself. The student focuses on information about the problem and even he may make some changes in it. So, the possibility of personal experience by the student makes the learning situation attractive and interesting for them and it strengthens their inner motivations. All these aspect have direct effect on exploring and developing creative potentials of students.

Overcoming mental barriers of creative thinking: In order to overcome mental barriers, the following should be taken into consideration:

- **Incorrect hypothesis:** Our attitude toward creativity has a great effect on our creativity in the future and on our selected way for encouraging others for showing their creativity. According to statistics, students and college students have the most creativity in the first year of their education because the barriers of creative thinking haven't been thought to them yet. In most cases, we consider the fluent expression or immediacy as the sign of powerful mind. These kinds of incorrect hypotheses are barriers to our creative thinking

Scientifics believe that if we have a fear of questioning traditions or other-made criteria, surely we lose the creative thinking opportunities.

- **Habits:** The fact that finding different choices is a difficult task for many people is resulted from our learning during the first years of school:

- **There only exists one correct answer:** So do not stop after finding the first answer. Search to find other answers on the basis of situation and circumstance
- **Having a detailed view to the problem:** This is true, especially about experts. They naturally focus on things in details in their field. They forget to look at new things beyond daily routines. So the people who use multi field approaches (a wider view), are valuable person in organizational view. We should consider all aspects and be prospective
- **Obeying rules:** It is necessary to question the existing barriers before creating new beliefs. Specially, it is essential for managers and employers to make this habit in themselves. We surely lose creative thinking opportunities if we fear questioning traditions or arbitrary criteria

Here we should think and delete the false hypotheses of “the creative thinking and disobeying rules let you to operate without any disciplines”. Yes, the creativity is an unorganized activity and sometimes it is necessary to disobey the rules in using the ideas. But, creativity is better developed when there is a goal and limitation. Therefore, there are stages in solving the problems creatively. Exactly for this reason, we behave appropriately when interacting with others. Respecting others and canniness are important parts of creative environment. So, we should recognize which laws of thought should be suspended for a new thought to emerged and which laws helps the improvement of creativity.

- **Attitudes and motivations:**
- **Negative thinking:** Negativity, criticism and excuses, ridicule and humiliation are mental barriers that have additional destructive effects. These barriers are not only the mental individualism barriers but also they affect those who are in contact with negative people. Another negative thinking which itself is a barrier to creativity is the fear of thoughts and inventions to be stolen when being presented and cooperating them with others. But some of the prospective companies have made working groups which emphasizes on cooperation. The main goal of these groups is information exchange
- **Avoid danger and fear of failure:** Not being risky is when we are too rule-oriented, fussy, obsessive or worried. Japanese companies, who care a lot about quality, welcome errors in the production line instead of ignoring deficits

The 3M Company encourages his employees' creativity and his researchers are allowed to allocate 15% of their time to study creative ideas and their favorite surveys.

To make creative ideas come true, there is a need for stability. We may experience failure in several

stages when we want an idea come true from its primary dream. Matson (the principle of Leonard Center of Pennsylvania University) found that the college students who make more mistakes at the beginning of the project will be the most successful at the end.

When Jack Welsh was the General Electric manager, said: “we reward failure”. And, he described that except this, is a barrier to braveness. According to Skoiler (1993), who is known as the most popular American pioneer inventor after Thomas Edison, failure is not a scandal and each failure should be analyzed and its reasons should be found. How to fail intellectually should be learned. To fail is one of the biggest world's arts.

- **Ambiguity avoidance:** High school and college students are often uncomfortable with ambiguity. They don't get bothered at all if they have a long night of homework, while providing detailed information and instructions. They do not like to guess about something or to extract information themselves for solving problems. So don't hurry to solve a vague situation very quickly. Look at the situation from different perspectives, ask more questions and especially let your unconscious mind to think about that ambiguity

CONCLUSION

One of the defining features of human and his main and essential points is power of thought. The most complex and highest expression of human thoughts is creative thinking. Creativity is creating a valuable and proper new design. In other words, creativity is using mental abilities to create a new thought or concept (Torens, 1986, as cited in Fallah Tafti (2009)). Creative people are divergent thinkers. Divergent thinking is different from the current streams of thoughts.

Creativity has components such as the domain of skills, creative thinking skills and motivation. To emerge and develop creativity, the confluence of these three elements must be specified because this confluence is a powerful combination that leads the person to creativity. Development of creativity depends on different personal and social factors such as intelligence, family, personal characteristics, etc. Although creative ability is potential and inherent, it requires appropriate training to emerge. For the survival of organizations in the future, the human needs to develop the today's children's creative power. Creating opportunities to foster creativity is considered as life and death for each society. Because of that, most societies have long been planning seriously to recognize creative children and teenagers and to use creative teaching techniques.

Therefore, we need extensive research on creativity, its nature and on the ways to nurture and

develop it and most important of all is the influential factors in development of creativity.

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