The Teaching of Creative Thinking

by Edward de Bono

Why some traditional approaches are not good enough.

Why just release from inhibitions and "craziness" is much too weak.

The logical basis of creativity and the systematic tools based on this.

What can be done.

First written by Edward de Bono in 1991, revised 2018

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The merchant had borrowed money from the moneylender to equip his trading venture. The merchant's ship had not returned on time, and it was presumed lost. The moneylender came to demand payment of the debt. The merchant was pleading for more time. The moneylender was insisting on immediate payment; otherwise, he would have the merchant thrown into the debtor's prison. They were arguing the point in the merchant's garden.

At this point the moneylender noticed the merchant's beautiful daughter. He told the merchant that in exchange for the daughter's hand in marriage, the debt would be cancelled. The merchant rejected the offer.

"You do not have much choice," replied the moneylender, "but I am a fair man. I am going to pick up two stones from this path on which we are standing, a black stone and a white stone. I shall put both stones into this leather bag. Your daughter will put in her hand and bring forth one of the stones without looking. If she picks the white stone, the debt is cancelled, and your daughter stays with you. If she picks the black stone, your daughter agrees to marry me, and the debt is cancelled. In all other cases, you pay the debt or go to debtor's prison."

Seeing that they would be no worse off and might even have a chance of escape, the daughter suggested they agree to the terms. She then watched the moneylender carefully and noted that he put two black stones into the bag. What was she to do? She could expose the moneylender as a cheat. She could take a black stone and then accept her fate or refuse to marry the fellow anyway. It was at this point that she used some lateral thinking.

She put her hand into the bag and drew out one of the stones. Then she immediately fumbled and dropped the stone onto the path. Once the stone had come to rest on the path, there was no way of telling which of the many stones on the path had been the one in the bag.

"Oh, I am so sorry," said the girl.

"It was a black stone you picked," said the moneylender.

"Nonsense," said the merchant. "There was not enough time to see the stone." "Then we must start over again," replied the moneylender.

"That will not be necessary," suggested the girl. "All we have to do is to open the bag and see the colour of the stone that remains behind. In that way we can surely tell the colour of the stone that was taken by me." She took the bag and handed it to her father.

The merchant opened the bag so that all could see the contents. At the bottom of the bag rested a black stone.

Logical with hindsight

"See," exclaimed the girl, "a black stone remains in the bag. So, I must surely have taken the white one."

The debt was cancelled. The girl remained with her father, and almost everyone was happy.

This is the story with which I opened my first book *Lateral Thinking* which was published in 1967. This story illustrates so well the nature of "lateral thinking."

In hindsight the girl's action is both logical and effective - but few people in the same situation would have thought of it.

> "Lateral Thinking is both a willingness
> to look at things in different ways and a
> deliberate process."

Add up all the numbers from 1 to 10. This is a simple task which anyone can do.

Now add up the numbers from 1 to 100.

There is nothing difficult about the task, but it is tedious, takes a long time and leaves plenty of room for mistakes.

Now write out the numbers from 1 to 100 as follows:

1   2   3......98   99   100

Now write them backwards under the first numbers to give

1   2   3......98   99   100

100 99   98......3   2   1

If you add up each vertical pair, you will always get 101. This is because the top row increases by one and the bottom row decreases by one, so the total must remain the same at 101. So, we have 100 X 101. But this is twice as many as we need as we have added up two lots of numbers from 1 to 100. So, we divide by 2 to get 50 X 101 which gives the answer of 5,050. Not only is this process quick, but the chance of making a mistake is reduced.

Once again, this process is completely logical in hindsight. Why then is it so difficult to see in the first place?

> "This process is completely logical in
> hindsight. Why then is it so difficult to
> see in the first place?"

In our intellectual culture, we have acknowledged the value of creativity but treated it as a special gift which some people might have and others can only envy. This view of creativity has applied mainly to artistic work. In all other areas we have felt-and continue to do so today-that logic is enough.

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Any valuable "creative idea" must always be logical in hindsight (after it has been seen). If the idea were not logical with hindsight, then we would never be able to see the value of the idea. Ideas that are not logical in hindsight remain as "mad" ideas. They may be mad forever or only until we catch up with the paradigm change. We would have no way of distinguishing between the two types of madness. So, if every valuable creative idea is logical in hindsight, then we claim that the idea could have been reached by "good" logic in the first place. We have incorrectly concluded that need to teach better logic and not creativity.

On one occasion I was discussing river pollution with some people concerned with this matter. Using one of the provocative techniques of lateral thinking and the word I invented many years ago to signal a provocation, I said: "Po, any factory is downstream of itself." This seems an absurdity. How could a factory be in two places at the same time?

From this deliberate provocation comes a simple idea. We would legislate that any factory built on a river must have its inlet (taking in water) downstream of its own outlet (putting out effluent). In this way the factory would always be the first to get its own pollution and would have to be more careful about cleaning up the effluent. This simple idea has now become legislation in some countries. Again, this idea is totally logical with hindsight.

The key word is perception. Our whole intellectual tradition has been concerned with processing methods such as logic and mathematics. We have not dealt with perception for the very simple reason that until relatively recently we had no idea how perception worked.

The importance of humour

My background is in psychology and in medicine where I worked on the complicated integrated systems of the body (respiration, circulation, kidneys, endocrine glands, nervous system) and had to develop an understanding of the behaviour of such self-organizing systems. In the course of my medical research, I became interested in the sort of thinking computers could not do: perceptual and creative. This is where an understanding of biological information processing came in useful in order to understand how neural networks could work as self-organizing information systems.

> "I became interested in the sort of thinking that computers could not do: perceptual and creative."

In my book *I am Right, You are Wrong*, I claim that humour is by far the most significant behaviour of the human brain. I mean this very seriously indeed and I am not just being provocative. Humour is by far the best indicator of the type of information system that is operating in the brain - at least in perception.

In 1969 I wrote a book called *The Mechanism of Mind* in which I described how nerve networks in the brain allow incoming information to organize itself into patterns and sequences. These ideas of self-organizing information systems are now common in the design of what was called neural networks in the 1980's and is now called artificial intelligence, AI or machine learning.

Humour clearly indicates a self-organizing information system in which information arranges itself into patterns, sequences or tracks.

> "Humour is by far the best indicator of the type of information system that is operating in the brain at least in perception"

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In a passive system, information is recorded without changing it. An external "processor" then proceeds to work with this information: choosing, arranging, and organizing the information. In an active system, however, the information and the information surface interact; and as a result, the information arranges itself into sequences and patterns.

The simplest example of an active information system is rain falling onto a landscape and organizing itself into streams, rivers and catchment areas.

In a passive information system, what is logical in hindsight must be equally logical in foresight. But in an active (self-organizing) system, something may be logical and obvious in hindsight but inaccessible to logic in foresight. This arises from precisely the same asymmetry of patterns that is the basis of humour. In a passive information system, humour could not exist.

In any active, self-organizing information system, there is a necessity for creativity and for provocation. But because the whole of our intellectual culture is based on passive information systems, we do not see this necessity.

The very excellence of the brain is its ability to allow experience to organize itself in this way. Without such a system, life would be so slow as to be impossible. The brain forms these tracks so that we recognize a situation by proceeding along the track that has been triggered by what we see around us. This is the nature of perception. The tracks have wide "catchment" areas just as rivers have wide catchment areas. This means that even if the external signal is not exactly the same as the usual one, we will still recognize the situation.

The general effect is shown in Figure 1, which illustrates a pattern with a wide catchment area.
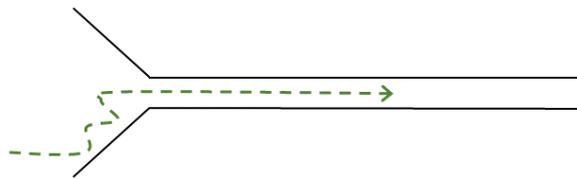
Because of the way the nerves interact with each other in the brain, the dominant track will suppress any alternative track for the moment. This gives rise to the situation illustrated in Figure 2.
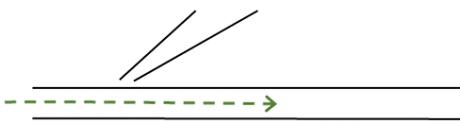
We proceed along the main track. Access to the side track is impossible. If somehow, we eventually manage to get across to the side track, then in hindsight the connection back to the starting point is easy and obvious as shown in Figure 3.
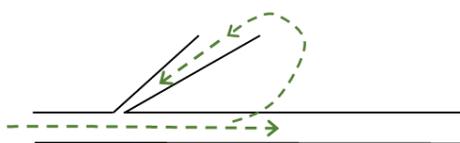
"We move *'laterally'* from the main track to the side track. Once there, we link backwards to the starting point and find that the new idea is logical with hindsight."

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It is precisely this asymmetry of patterns that gives rise to both humour and creativity. In a joke the teller suddenly takes the audience to the end of the side track, and immediately they see the connection with the starting point. Creativity is the same process. We move "laterally" from the main track to the side track. Once there, we see that the idea is perfectly logical in hindsight.

But how do we make that lateral move? That is where the deliberate techniques of lateral thinking come into use.

Being uninhibited is not enough

A prisoner is thrown, bound hand and foot, into a deep pit. After an energetic struggle, the prisoner wriggles out of his bonds and shouts, "I am free! I am free!"

The traditional approach to creativity is along the same lines. We know that people are inhibited by the fear of making mistakes and the fear of looking ridiculous. We know that an education system which demands the "one right answer" makes people search for the standard way of doing things. This heavy load on inhibitions presses down and prevents people from being spontaneous and even creative.

It must follow that if we remove the inhibitions, then people will be "creative." This is the basis of so much of traditional creative training. Set people free. Give them the courage to come up with unorthodox ideas. Remove the fear of seeming ridiculous. Surely the result must be creativity?

The prisoner at the bottom of the pit is certainly freer when he is out of his restricting bonds. But the freedom is relative. He is still at the bottom of the pit. What he needs to get out of the pit is not just "freedom from bonds" but some climbing skills and techniques which will enable him to climb out of the deep pit with its vertical walls.

It is traditionally assumed that the brain is naturally creative and is only inhibited by education and the fear of being wrong. Remove these inhibitions and you restore the natural creativity of the brain. But this is a myth. The brain is not designed to be creative. The excellence of the brain arises directly from its ability to make patterns, to use these patterns and to reject deviations from these patterns.

> "The brain is not designed to be creative. The excellence of the brain arises from its ability to make patterns, to use these patterns and to reject deviations from these patterns"

That is a marvellous system which allows the brain to make sense of the immensely complicated world around. But it is the opposite of creativity. When this coordinated pattern-making and pattern using is disrupted, we get the madness of psychosis. If we can no longer make sense of the world around, we may indeed have some "unusual" ideas, but this is not useful creativity. For example, we need to develop the ability to set up and use provocations.

Figure 4 illustrates how inhibitions may indeed suppress our creativity below the "normal" level. So, removing the inhibitions does make us mildly more creative as we return to the normal level of curiosity and exploration and playing around. In order to go beyond this base level we have to learn some deliberate and formal techniques that are not "natural" at all.
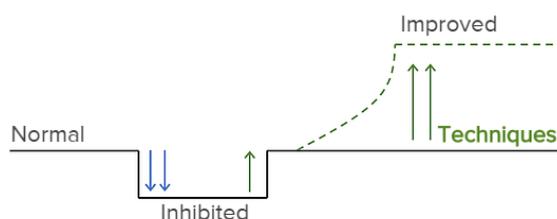
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The cause of serious creativity has been badly damaged by those who advocate that it is all a matter of "craziness" and that being "off the wall" is the same as being creative. This is a total misunderstanding of the nature and purpose of provocation.

Creativity is a logical process -but it is not the logic of passive information systems. It is the logic of self-organizing patterning systems with their asymmetric patterns. In such systems there is a logical need for provocation.

The definition of a provocation is simple: "There may not be a need for saying something until after it has been said." This is totally contrary to normal logic in which the reason for saying something must precede the statement.

The logical purpose of a provocation is to help us to move from the main track pattern across to the side track.

I also invented the new word po, which signals very clearly that the statement is being used deliberately as a provocation. So, if I say, "Po, cars should have square wheels," I am not seriously advocating the use of square wheels. The purpose of the provocation is to force our minds out of the usual groove and to increase the chance of getting across to a new idea, as illustrated in Figure 5.
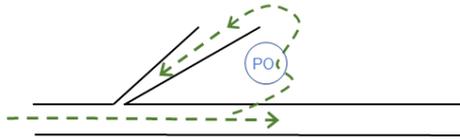
Traditional brainstorming often gave the impression that it was enough to be "crazy" and maybe a useful idea would turn up. This sort of scatter-gun approach might have had some validity in the advertising world where novelty can be a sufficient value, but in every other field there is a need for an idea which is not just novel but also effective. So many people have been turned off by this weak and seemingly crazy process of brainstorming.

In lateral thinking, there are formalized and systematic techniques for setting up provocations: escape, distortion, exaggeration, etc. These techniques can be learned, practiced and used. These techniques can be taught to others to use.

Forty years of experience in the field have taught me that these systematic techniques work in a powerful manner.

After Montreal had sustained huge debts from its hosting of the 1976 Olympic Games, no city in the world wanted the 1984 Games. Finally, Los Angeles only agreed to host the Games because there was a "guarantee" from the organizing committee that there would be no debts. In the end, the Los Angeles Games made a surplus of $255 million and were so successful that today cities around the world compete fiercely to get the Games which no one had wanted. When Peter Ueberroth, the outstanding organizer of the Los Angeles Games, was asked in an interview in the Washington Post (September 30, 1984) how he had generated the new concepts needed to make a success of the Games, he replied that he had used lateral thinking and he mentioned the process of provocation. When I asked him about this, he reminded me that he had first learned his lateral thinking from a short talk I had given to a meeting of the Young Presidents' Organization in Boca Raton in 1975. This example illustrates three things:

1. That the techniques can be taught.

2. That the techniques can be used deliberately.

3. That the techniques can have a powerful effect.

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Of course, the major factor in the success of the Los Angeles Games was the ability of Mr. Ueberroth as an organizer, leader and motivator of a very capable team. Nevertheless, there is a point when new concepts are needed - and that is where lateral thinking comes in.

It is not just a matter of being "crazy" and hoping that something happens. There is a logical basis to provocation and systematic ways of setting up and using provocations. Quite often teachers of creative thinking who do not understand the logical basis (the behaviour of neural networks) pick up on the provocation and believe that it simply means being "crazy."

The use of provocations

In traditional brainstorming or the general teaching of creativity, there is much talk of "delaying judgment," "suspending judgment," "deferring judgment," etc. This arises from the simple observation that instant criticism of an idea can kill the idea and makes creativity virtually impossible. So, if judgment prevents creativity, let us delay judgment.

But delaying judgment is the absence of activity. Telling a person not to use instant judgment does not tell that person what to do. What do you do with a provocation? Do you just suspend judgment and hope that something useful will happen?

Many years ago, I introduced the formal process of "movement." This is an active mental operation. It is not just an absence of judgment any more than a car is just an absence of a bicycle.

There are formal and systematic techniques of movement (extract a principle, moment-to-moment, etc.) which can be learned, practiced and used. These techniques can also be taught directly and formally.

> "But delaying judgment is the absence of activity. Telling a person not to use instant judgment does not tell that person what to do. There is a need for the active mental operation of *movement*."

Judgment is based on traditional "rock logic", but movement is based on the "*water logic*" of perception. Rock logic is based on identity (is and is not). Water logic is based on "flow" (What does this flow to?).

All these processes can be handled in a deliberate and systematic manner. It is very different from just messing about, being "crazy" and hoping that something will happen.

Traditional brainstorming has always depended on a group format because this is an essential part of the process. The presence of other people in the group provides the stimulation to set off new ideas and new lines of thinking.

All the systematic lateral thinking techniques can be used by an individual entirely on his or her own. This is because the formal techniques of provocation allow an individual to provide his or her own stimulation at will. There is no need to depend on stimulation from others.

In my experience, individuals working systematically on their own produce far more ideas than when they are working together as a group. There is more thinking time and different directions can be pursued.

Groups do have their value both as a motivating setting and also to develop the ideas that have already been started.

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In practice I prefer to work with a combination of group and individual creative thinking whenever this is possible.

The "random input" lateral thinking technique is extremely easy to use and very effective. It is now used widely by new product groups, research departments, marketing departments and even by rock groups when writing new songs. At first sight the notion of pulling in a totally random word to open new lines of thinking seems absurd. Yet he technique is soundly based on the behaviour of patterning systems. Finding your way back from the periphery of a town may reveal a road you would never have taken out from the centre.

Like many other of my techniques, this simple technique has been borrowed by many practitioners in creativity who usually forget to acknowledge its source. What is more important than acknowledgment is that techniques borrowed in this way are too often distorted or altered in ways that make them far less effective. This is because the person "borrowing" the technique does not understand its real basis and has had no proper training in the use of the technique.

Another example of a technique that is very simple and effective is the *Six Thinking Hats*.

Powerful and simple tools

The six coloured hats each indicate one mode of thinking (information, feeling, logical positive, logical negative, creative, process control). It is now possible to request a specific type of thinking:

> "It is time we had some green hat (creative) thinking. Let's have two minutes of green hat thinking."

It is also possible to place "caution" and "critical" thinking (black hat) back in its proper place instead of having it come in at any time. Intuition and feeling (red hat) are legitimized so that it becomes possible to express feelings without having to apologize for them or even justify them:

> "This is my red hat thinking on this matter."

It is the practicality and powerful simplicity of the method which has led to its wide adoption. The technique really does change thinking behaviour throughout an organization.

In the end, thinking tools must be practical, simple and robust. They must also be soundly based and fully understood by those who set out to teach the tools.

The tools must be practical and easy to remember. Many training programs have complicated schedules and steps. These seem impressive at the time of teaching but are low in practicality because the student must spend most of the time trying to remember the correct sequence of steps in the schedule. I prefer to treat tools as a carpenter. You become familiar with the tools and the use of them as appropriate. The carpenter uses a hammer when he or she feels a hammer should be used and a saw when that is appropriate.

Simplicity is the key word. Confusion and complexity are the enemies of training in thinking skills. Keep it simple, know what you are doing and make sure it is soundly based.

Talent or training

Many people feel that creativity is a natural talent and that nothing can be done about it. This attitude is held for two reasons:

1. It provides a very good excuse for not having to do anything about creativity.

2. The person with this view has not yet come across any serious method of improving creative skills and has been put off by the messing around and "crazy" approaches used so often.

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It is often said that Beethoven, Mozart or Van Gogh did not have to learn creativity. There are two points to be made here. The first point deals with artistic creativity. The word creativity in the English language covers an extremely broad area. Many artists are not really "creative" in my sense of the word but are productive stylists producing within a style of perception and expression but not really changing that style.

I am interested in the creativity involved in the changing of perceptions and concepts, and that is why I have given the specific term lateral thinking to this process. There may be an overlap with artistic creativity and some artists (composers, etc.) do use my methods, but there are other aspects which may be quite different (emotional and spiritual resonances, etc.).

There is no reason to suppose that an artist will make a good teacher of creativity simply because the word creativity is involved in art.

> **"I am interested in the creativity involved in the changing of perceptions and concepts."**

The second point to be made about the "Beethoven" remark is that the purpose of creative training is not to produce super-geniuses but to give everyone a workable level of creative skill. When we teach mathematics in school, we do not pretend that every student is going to become a Poincare. We know that mathematics is useful in most activities, and we want to give students the ability to use that skill. Not every coached tennis player is going to win at Wimbledon, but most people can be taught to play a useful game of tennis.

If we do nothing at all about training creativity, then we have to fall back on natural talent because there is nothing else. But that does not mean that nothing can be done. Natural running ability can take us a certain distance at a certain speed. We could be content with that. The invention of the bicycle provides a mechanism by which the same human muscle power can take us much farther and much faster. Natural mathematical ability would not have gotten us very far without formal notations and methods. Today computers are allowing mathematicians to go beyond human ability.

In the same way, formal techniques of creative thinking allow us to become much more creative. When I wrote my first books on lateral thinking, I half expected truly creative people to ignore this work and to claim that they knew all there was to know about creativity. Exactly the opposite happened. Such people were the first to show a great interest in what I was doing, and they wrote to tell me how useful they found the techniques. To this day highly creative people tell me that they don't just rely on their own natural talent, but also formally use lateral thinking techniques step by step when they need a new idea.

There is the very old-fashioned idea that creativity means "freedom" and therefore any techniques or methods must inhibit creativity. This is nonsense.

Life is full of examples of "liberating" structures which allow us to do things we could never do without these structures: carpenter's tools, painter's brushes and paints, a ladder, a cup, mathematical notation, maps, surgical instruments, the telescope, etc. These are all structures which allow us to exert our talents more effectively.

People who are talented in creativity find that the training and formal techniques enhance their skill. People who have never considered themselves to be creative find that the formal techniques allow them to build up a useful skill of creativity - and the creative attitudes follow from the use of the tools. People who are conformist and have hitherto believed that creativity is only for "rebels" find that conformists can learn the "game" of creativity and can become even more creative than the rebels.

There is not an either-or polarization between talent and training. As with any skill, the two go together.

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Everyday creativity

There is a level of everyday creativity that should become part of our normal thinking skills. This should apply to everyone in an organization. In an ideal society, creativity would be a part of education at all levels. Analysis of information is not enough. We need to develop the skills of design in order to make things happen. Design needs creative skills.

In any organization there should be an attempt to train all personnel in basic creative thinking skills. This can be done most easily by providing training in some of the deliberate techniques of lateral thinking. This provides people with something to do. Just exhorting people to "be creative" is not effective. As the simple lateral thinking tools get used, the behaviour and attitudes incorporated in the tools become part of the thinking skill of that person and can be applied even if the tool itself is not formally used.

> ### "People who have never considered themselves to be creative find that the formal techniques allow them to build up a useful skill of creativity."

Training in creativity should be an essential part of such programs as quality management, continuous improvement, cost-cutting and customer service. In all such programs, there is an element of analysis and information collecting. There is the application of "common sense" principles. But there is also a need to generate alternatives and new ways of doing things. The creative belief that anything can probably be done in a better way is a basic attitude that is much needed in such programs. I have written about the necessity of seeking *Simplicity* as a goal and using creativity to achieve it.

There are special areas where there is a continual demand for fresh thinking: research; product development, marketing, corporate strategy and even labour relations. People in such areas are often quite complacent about their creative skills, which undoubtedly exist. When they see how the formal techniques of lateral thinking can supplement those skills, they often become enthusiastic about the use of these techniques.

The specific use of creativity involves the formal definition of creative focuses and creative tasks. Once there is a willingness to take creativity seriously and set up creative training, then it becomes possible to define targets which need new ideas and new concepts. In this way creativity becomes a corporate resource which can be used deliberately and in a focused manner. Where do we need new ideas? Now let's do something about those areas.

Experience and instruction

I have been working for more than forty years in the direct teaching of creative thinking skills and in the teaching of general thinking skills. I have worked with different ages, skill levels and cultures in 45 countries with widely different backgrounds and ideologies.

My experience has shown me that the basic skills of creative thinking can be taught and applied. I have worked with governments, Nobel Laureates, school teachers and their students and multinational corporations. As competing organisations move to an equivalent level of "competence," and automation and computerisation replaces predictable human tasks, there is the growing realization that only creativity will make a difference in the future. Organizations are taking creativity seriously a basic part of their talent development.

There is a global network of training consultants authorised by me to train and qualify people to become instructors in the use of my methods. Creative thinking is a transferable and useful skill.

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