

CREATIVITY

Flow and the psychology of discovery and invention

Mihaly Csikszentmihalyi

This is a fascinating book by Mihaly Csikszentmihalyi one of the less well known but probably one of the most serious management scholars of recent times. He brings out the importance of creativity, outlines its building blocks and explains how we can all become more creative.

Introduction

Without creativity, it would be difficult to distinguish humans from other animals. Creativity leads to a fuller, more satisfying life. Without creativity, mankind would not progress.

Csikszentmihalyi points out that creativity cannot be understood by looking only at the people who appear to make it happen. Creative ideas need a receptive audience to record and implement them. And without the assessment of competent outsiders, we cannot decide whether the claims of a self-styled creative person are valid.

Creativity results from the interaction of a system consisting of three elements: a culture that contains symbolic rules, a person who brings novelty into the symbolic domain, and a field of experts who recognize and validate the innovation.

Creativity is the process by which a symbolic domain in the culture is changed. So we must learn the domain well. To master a domain, we must pay attention to the information to be assimilated. Bulk of our attention is committed to the tasks of surviving from one day to the next. And we do not do much with the small amount of attention left over because of the lack of focus. Diffused thinking leads to lack of concentration. Creativity is possible only when we are able to focus attention on the problem at hand.

Each of us is born with two contradictory sets of instructions: a conservative tendency, made up of instincts for self-preservation, self-aggrandizement, and saving energy, and an expansive tendency made up of instincts for exploring, for enjoying novelty and risk. We need both. But whereas the first tendency requires little encouragement, the second can wilt if it is not cultivated. If too few opportunities for curiosity are available, if too many obstacles are placed in the way of risk and exploration, the motivation to engage in creative behaviour is easily extinguished. Sustaining high levels of curiosity is the starting point of creativity.

Understanding Creativity

When we use the term creativity, different images come to our mind. There are bright persons who express unusual thoughts, who are interesting and stimulating. Unless they also contribute something of permanent significance, these people must be called brilliant rather than creative.

Then there are people who experience the world in novel and original ways. These are individuals whose perceptions are fresh, whose judgments are insightful, who may make important discoveries. The author calls such people personally creative. Finally, there are individuals who, change our culture in some important respect. They are the creative ones without qualifications.

Creativity, as mentioned before, consists of three main parts. The first of these is the domain, which consists of a set of symbolic rules and procedures.

The second component of creativity is the field, which includes all the individuals who act as gatekeepers to the domain. They decide whether a new idea or product can be accepted. For example, in the visual arts, the field consists of art teachers, curators of museums, collectors of art, critics, and administrators of foundations and government agencies that deal with culture. These people decide what new works of art must be recognised, preserved, and remembered.

The third component is the individual, who using symbols of a given domain, comes up with a new idea or sees a new pattern. His or her thoughts or actions change a domain, or establish a new domain.

The level of creativity in a given place at a given time does not depend only on the amount of individual creativity. It depends just as much on how well suited the respective domains and fields are to the recognition and diffusion of novel ideas.

Domain

Each domain is made up of its own symbolic elements, its own rules, and generally has its own system of notation. In many ways, each domain describes an isolated little world in which a person can think and act with clarity and concentration. The existence of a domain is perhaps the best evidence of human creativity. Domains create order that is not programmed into our genes by biological evolution.

There are several ways in which domains can help or hinder creativity. Three major dimensions are particularly relevant: the clarity of structure, the centrality within the culture, and accessibility.

Different domains are structured in different ways. The symbolic system of mathematics is organized relatively tightly; the internal logic is strict; there is a high degree of clarity and lack of redundancy. Therefore, it is easy for a young person to assimilate the rules quickly and jump to the cutting edge of the domain in a few years. For the same reasons, when a novelty is proposed, it is immediately recognized and, if viable, accepted. By contrast, it takes decades for social scientists or philosophers to master their domains, and if they produce a new idea, it takes the field many years to assess whether it is an idea worth adding to the knowledge base. No wonder, economists win the Nobel prize several years after they develop a new model or theory.

Field

A field is necessary to determine the worth of a new idea. No culture can assimilate all the novelty people produce without dissolving into chaos.

Fields can affect the rate of creativity in three ways. The first way is by being either reactive or proactive. A reactive field does not solicit or stimulate novelty.

The second way is the approach to screening new ideas. Some fields are conservative and allow only a few new items to enter the domain at any new given time. They reject most novelty and select only what they consider best. Others are more liberal in allowing new ideas into their domains.

Finally, fields can encourage novelty if they are well connected to the rest of the social system and are able to channel support into their own domain.

Domains and fields affect each other in various ways. Sometimes domains determine to a large extent what the field can or cannot do. This is probably more usual in the sciences, where the knowledge has several restrictions on what is possible. In the arts, on the other hand, it is often the field that takes precedence. The artistic establishment, without firm guidelines anchored in the past, evaluates new works of art.

Being in the right place at the right time is an important part of creativity. But to know that one is indeed staring at an opportunity needs a prepared mind. Many people never realise that they are surrounded by favourable circumstances and even fewer know what to do when the realization hits them.

The creative person

Creative individuals are remarkable for their ability to adapt to different situations and to manage with whatever is needed to reach their goals. If nothing else, this distinguishes them from the rest of us. But there does not seem to be a particular set of traits that a person must have in order to be creative.

Creativity is facilitated by a *genetic predisposition* for a given domain. A person whose nervous system is more sensitive to color and light will have an advantage in painting, while someone born with a perfect pitch will do well in music. And being better at their respective domains, they will become more deeply interested in sounds and colors, will learn more about them, and thus are in a position to innovate in music or art with greater ease.

Although most great scientists seem to have been attracted to numbers and experimentation early in life, how creative they eventually became, bears little relationship to how talented they were as children. However, a special sensory

advantage may be responsible for developing an early *interest in the domain*, which is certainly an important ingredient of creativity.

A person also needs *access to a domain*. Luck does play a big role. Being born in an affluent family or being close to good schools, mentors, and coaches obviously is a great advantage. But, luck is not everything. Many creative people have shown extraordinary pluck and determination to get access to a domain.

Access to a field is equally important. Some people are terribly knowledgeable but they find it so difficult to communicate with those who matter among their peers that they are ignored or shunned in the formative years of their careers.

Someone who is not known or appreciated by the relevant people has a very difficult time accomplishing something that will be seen as creative. Such a person may not have a chance to access the latest information, may not be given the opportunity to work, and if he or she does manage to accomplish something novel, that novelty is likely to be ignored or ridiculed. In the sciences, being at the right university is extremely important.

What makes creative people different from others is *complexity*. They show tendencies of thought and action that in most people are segregated. Having a complex personality means being able to express the full range of traits that are potentially present in the human repertoire but usually atrophy because we think that one extreme is “good,” whereas the other extreme is “bad.”

Most of us have a repressed shadow side that we refuse to acknowledge. The very orderly person may long to be spontaneous, the submissive person wishes to be dominant. As long as we disown these shadows, we can never be satisfied. But we usually do this and keep on struggling against ourselves, trying to live up to an image that distorts our true being. A complex personality involves the ability to move from one extreme to the other as the occasion requires.

Creative individuals have a great deal of physical energy. They work long hours, with great concentration, while projecting an aura of freshness and enthusiasm. But the energy of these people is internally generated and is due more to their focused minds than to the superiority of their genes.

Creative persons are not necessarily hyperactive. In fact, they often take rests and sleep a lot. But when they are working, their energy is under their own control. When necessary they can focus it like a laser beam. When it is not, they immediately start recharging their batteries. They consider the rhythm of activity followed by idleness or reflection very important for the success of their work.

Creative individuals tend to be smart, yet also naïve at the same time. Low intelligence can undermine creativity. But being intellectually brilliant can also be detrimental to creativity. People with high IQs may get complacent. Secure in their mental superiority, they lose the curiosity essential to achieving anything new. If

learning facts and understanding the existing rules of domains, comes too easily to a high-IQ person, there may be no incentive to question, doubt, and improve on existing knowledge.

Furthermore, people who bring about an acceptable novelty in a domain seem able to use well two opposite ways of thinking: the *convergent* and the *divergent*. Convergent thinking involves solving well-defined, rational problems that have one correct answer. Divergent thinking leads to no agreed upon solution. It involves the ability to generate a great quantity of ideas; to switch from one perspective to another; and to pack unusual associations of ideas. Divergent thinking is not much use without the ability to tell a good idea from a bad one – and the selectivity involves convergent thinking. Many creative individuals have only two or three good ideas in their entire career, but they are so good that they keep these people busy for a lifetime.

A third paradoxical trait refers to the related combination of playfulness and discipline. A playfully light attitude is typical of creative individuals but they are also dogged and perseverant as much hard work is necessary to bring a novel idea to completion and to surmount the obstacles a creative person inevitably encounters.

Creative individuals alternate between imagination and fantasy at one end, and a rooted sense of reality at the other. They break away from the present without losing touch with the past.

Such people also show shades of both extroversion and introversion. Usually each of us tends to be one or the other, either preferring to be in the thick of crowds or sitting on the sidelines. Creative individuals, on the other hand, seem to express opposing traits at the same time.

These individuals are well aware of the scholars who have preceded them and their contributions. They also are aware of the role that luck has played in their own achievements. And they are usually so focused on future projects and current challenges that their past accomplishments, no matter how outstanding, are no longer very interesting to them. At the same time, creative individuals know that in comparison with others they have accomplished a great deal. So they display a sense of security and self-assurance.

Creative individuals are also able to manage the paradox between ambition and selflessness. They can be simultaneously ambitious and aggressive and willing to subordinate their own personal comfort and advancement to the success of the projects they are working on.

These are psychologically androgynous people who can interact with the world in terms of a much richer and varied spectrum of opportunities. Creative individuals often have not only the strengths of their own gender but those of the other one, too. For example, creative girls often tend to be more dominant and tough than other girls, and creative boys are more sensitive and less aggressive than their male

peers. Similarly, women artists and scientists tend to be much more assertive, self-confident, and openly aggressive than typical women. At the same time, creative men display femininity through their great preoccupation with their family and their sensitivity to subtle aspects of the environment.

It is impossible to be creative without having first internalized a domain or culture. And a person must believe in the importance of such a domain in order to learn its rules; hence he or she must be to a certain extent a traditionalist. So a person cannot be creative without being both *traditional and conservative* and at the same time *rebellious and iconoclastic*. Being only traditional leaves the domain unchanged. At the same time, recklessness and taking too many chances, may not really pay off.

Most creative persons are very passionate about their work, yet they can be extremely objective about it as well. Passion is needed to sustain interest in a difficult task. But without objectivity, the work may lack credibility and not find enough takers.

The openness and sensitivity of creative individuals often exposes them to *suffering and pain, yet also a great deal of enjoyment*. The suffering is easy to understand. Their greater sensitivity can cause slights and anxieties that are not usually felt by the rest of us. Perhaps the most important quality of creative individuals, is the ability to enjoy the process of creation for its own sake. That is why these people forgo more lucrative career opportunities to remain focused on what they like to do.

The Work of Creativity

The creative process consists of five steps.

The first is a period of *preparation*, becoming immersed, consciously or not, in a set of problematic issues that are interesting and arouse curiosity.

The second phase is a period of *incubation*, during which ideas churn around below the threshold of consciousness. It is during this time that unusual connections are likely to be made. Because of its mysterious quality, incubation has often been thought the most creative part of the entire process. What happens in this “dark” space defies ordinary analysis and evokes the original mystery shrouding the work of genius. How long a period of incubation is needed varies depending on the nature of the problem. It may range from a few hours to several weeks and even longer.

The third component of the creative process is *insight*, when the pieces of the puzzle fall together.

The fourth component is *evaluation*, i.e., deciding whether the insight is valuable and worth pursuing. This is often the most emotionally trying part of the process, when one feels most uncertain and insecure. Is this idea really novel, or is it obvious?

The fifth and last component of the process is *elaboration*. This stage takes up the most time and involves the hardest work. After an insight occurs, one must validate it. Most lovely insights never go any farther because under the cold light of reason, fatal flaws appear. But if everything checks out, the slow and often routine work of elaboration begins.

There are four main conditions that are important during this stage of the process. First of all, the person must pay attention to the developing work. Next, one must pay attention to one's goals and feelings, to know whether the work is indeed proceeding as intended. The third condition is to keep in touch with domain knowledge, to use the most effective techniques, the fullest information, and the best theories as one proceeds. And finally, it is important to listen to colleagues in the field to get a sense that things are moving in the right direction and also make the most effective sales pitch.

Usually insights tend to come to prepared minds, that is, to those who have thought long and hard about a given set of problematic issues. There are three main sources from which problems typically arise; personal experiences, requirements of the domain, and social pressures.

Early experience predisposes a young person to be interested in a certain range of problems. Without a burning curiosity, we are unlikely to persevere long to make significant new contributions.

The inspiration for a creative solution usually comes from a conflict in the domain. Every domain has its own internal logic, its pattern of development, and those who work within it must respond to this logic. An intellectual problem may not be restricted to a particular domain. Indeed, some of the most creative breakthroughs occur when an idea that works well in one domain is transplanted in another. Many creative people are inspired by a gap or discrepancy in their domain that becomes obvious when looked at from the perspective of another domain. And then there are people who sense problems in "real" life that cannot be accommodated within the symbolic system of any existing domain.

Social pressures too can contribute. An economic depression or a change in political priorities may encourage one line of research and push another into the backburner. Wars can also affect the direction of science and arts. It is no coincidence that Einstein's theory of relativity, Freud's theory of the unconscious, Eliot's free form poetry, Picasso's deformed figures and James Joyce's stream of consciousness prose were all created and gained public acceptance in the same period in which the old order changed and belief systems rejected old certainties. More recently, the Egyptian writer Naguib Mahfouz's work has been influenced by colonialism, shifting of values, social mobility and the changing roles of men and women.

The Flow of Creativity

Creative persons differ from one another in a variety of ways, but in one respect they are same. They love what they do. Creative individuals internalize the field's criteria of judgement to the extent that they have the ability to separate bad ideas from good ones, so that they don't waste much time exploring blind alleys. The flow experience has the following building blocks:

- *There are clear goals every step of the way*
- *There is immediate feedback to one's actions*
- *There is a balance between challenges and skills*
- *Action and awareness are merged*
- *Distractions are excluded from consciousness*
- *There is no worry of failure*
- *Self-consciousness disappears*
- *The sense of time becomes distorted*
- *The activity becomes autotelic .*

Focus and concentration hold the key to achieving flow. Many of the peculiarities attributed to creative persons are really just ways to maintain concentration and lose themselves in the creative process. Distraction interrupts flow and it may take hours to recover the peace of mind one needs to get on with the work. The more ambitious the task, the longer it takes to lose oneself in it, and the easier it is to get distracted.

When we are in flow, we do not usually feel happy – for the simple reason that in flow we feel only what is relevant to the activity. Happiness is a distraction. It is only after we get out of flow, at the end of a session or in moments of distraction within it, that we might indulge in feeling happy. And then there is the rush of well-being, of satisfaction that comes when the work is completed. In the long run, the more flow we experience in daily life, the more likely we are to feel happy overall.

Twenty-five centuries ago, Plato wrote that the most important task for a society was to teach the young to find pleasure in the right objects. Unfortunately, it is easier to find pleasure in things like sex, eating, mating, making money, etc because these activities are in synchrony with survival strategies established long ago in our physiological makeup. It is much more difficult to learn to enjoy doing things that were discovered recently in our evolution, like manipulating symbolic systems by doing math or science or writing poetry or music.

Creative Surroundings

The place where one lives is important for three main reasons. One must be able to access the domain in which one plans to work. Information is not distributed evenly in space but is concentrated in different geographical nodes. Certain environments facilitate interaction and provide more excitement and a greater effervescence of ideas. Therefore, they prompt the persons who are already inclined to break away

from conventions to experiment with novelty more readily. For example, the closer one is to the major research laboratories, journals, departments, institutes, and conference centers, the greater the chances of being creative. Sometimes sudden availability of money at a certain place attracts artists or scientists and that place becomes, at least for a while, one of the centres of the field.

Creativity can be stimulated by a congenial physical environment. But this is not a simple causal relationship. When creative persons find themselves in beautiful settings, they are more likely to find new connections among ideas, new perspectives on issues they are dealing with. But it is essential to have perspectives on issues we are dealing with, i.e., to have a “prepared mind.” Without some insights and perspectives, nothing much is likely to happen.

Our workplace and home should reflect our needs and tastes. The objects around us should help us become what we intend to be. How we use time and how we schedule our activities should reflect the rhythm that work best for us. If in doubt we must experiment until we discover the best timing for work and rest, for thought and action, for being alone and for being with people.

The Early Years

It is impossible to tell whether children will be creative or not just by looking at their early talents. Some children do show signs of extraordinary precocity in some domain or other.

But creativity involves changing a way of doing or looking at things and that in turn requires mastery of the old ways of doing or thinking. No matter how precocious children are, this they cannot do. The earlier years provide at best only glimpses of extraordinary ability in the domain they eventually turned to.

Creativity can be boosted through early exposure to the wealth and variety of life. The family plays an important role. Parents can encourage the pursuit of knowledge, instil intellectual discipline, and introduce their children to career opportunities and facilitate access to the field. They can also play a crucial role in shaping character. In many cases parents are the main source of the curiosity and involvement with life that is so characteristic of these creative individuals.

Many creative people lost their fathers early in life. But there are also examples of a warm and stimulating family context. So we cannot conclude that hardship or conflicts are necessary to unleash the creative urge. In fact, creative individuals seem to have had either exceptionally supportive childhoods or very deprived and challenging ones. What appears to be missing is the vast middle ground.

It seems schools do not have much impact on the lives of creative people. Schools seem to extinguish the interest and curiosity that the child had discovered outside its walls. At the same time, individual teachers often awaken, sustain, or direct a child's

interest. These teachers take note of the student's potential. They give the child extra work to do and provide greater challenges compared to the rest of the class.

When we study the lives of creative people we find all kinds of patterns. Some were precocious – almost prodigious – and others had a normal childhood. Some had difficult early years, lost a parent, or experienced various forms of hardship; others had lost a family member. A few even had normal childhoods. Some encountered supportive teachers; others were ignored and had bad experiences with mentors. There were some who knew early in life what career they would pursue, while others changed their direction as they matured. Recognition came early to some and late to others.

In short, genes or the events of early life alone do not shape the likes of creative people. Rather, over time, creative people make do with whatever came to hand. Instead of being shaped by events, they shape events to suit their purposes.

The Later Years

Curiosity and drive are in many ways the yin and the yang that need to be combined for becoming creative. Curiosity requires openness to outside stimuli. It is playful and deals with objects and ideas for their own sake. Drive needs inner focus, seriousness, competitive spirit and achievement orientation. The curiosity and commitment of creative people often directs them to confront the social and political problems that most people are too content to leave alone.

As the fame of creative individuals spreads, they inevitably take on responsibilities beyond the ones that made them famous. There are two main reasons for this, one internal, the other external. With age, creative persons may run out of steam or challenges, ideas or feel boxed in by the limitations of their specialty or by the shortcomings of their lab and their tools.

Famous creative people also have to cope with the demands the environment places on them. There are many administrative positions in which a respected name is a great asset. Government agencies and private foundations like to have them on board. More than money, or power, it is the feeling that there is something important that needs to be done and that they are the people who can do it, that prompts creative people to take up such assignments.

But creative people keep themselves meaningfully occupied all the time. They never seem to have surplus time. They do not easily get bored. Nor do they spend even a few minutes doing something they don't believe is worthwhile.

Creative Aging

There are two kinds of intelligence. The first is *fluid intelligence*, or the ability to respond rapidly, to have quick reaction times, to compute fast and accurately. This type of intelligence is innate and is little affected by learning. Its various components

peak early – teens, twenty's or thirty's. Each later decade shows some decrease in these skills, and after age seventy, the decline is usually quite severe even among otherwise healthy individuals.

The second type of mental ability is known as *crystallized intelligence*. It is more dependent on learning than on innate skills. It involves making sensible judgments, recognizing similarities across different categories, using induction and logical reasoning. These abilities depend more on reflection than quick reaction, and they usually increase with time, at least until the age of sixty. Creative people seem to depend more on crystallised intelligence.

As they grow older, creative people may find themselves under much pressure with too little time, often due to over commitment. Physical fitness is another concern. On the other hand, with age there is less anxiety over performance, and more display of courage, confidence, and risk taking. With age it is also possible to occupy a central position in the field, or to develop new forms of association, especially with students.

The promise of more and different knowledge never lets down creative individuals. They can lose physical energy and cognitive skills, but symbolic domains remain always accessible and their rewards remain fresh till the end of life. Many creative people take full advantage of changes in the domain. Creative individuals see age in a positive light, because they are still deeply involved in exciting and rewarding tasks.

Erik Erikson refers to the last psychological stage of life as achieving integrity. If we live long enough and resolve all the earlier tasks of adulthood – then there is a last remaining task that is essential for our full development as a human being. This consists in bringing together into a meaningful story our past and present, and in reconciling ourselves with the approaching end of life. Many creative people seem to fall in this category.

Creative people often blend pride in family with pride in work. Many of them are also driven by a feeling of responsibility for the common good. But they shoulder this as a privilege rather than a duty. Although they work hard to help improve our lives, they claim that they mostly enjoy what they do.

Nurturing Creativity

The human species could not survive, either now or in the years to come, if creativity were to run dry. At the same time, the main threats to our survival as a species, the very problems we hope creativity will solve, were brought about by yesterday's creative solutions.

Human well-being hinges on two factors: the ability to increase creativity and the ability to develop better ways to evaluate the impact of new creative ideas. Leaving this to individuals or market forces may not be the right thing to do always. Each field expects society to recognize its autonomy, yet each feels accountable only to

itself, according to the rules of its own domain. It is also doubtful that decisions left to the free market would be wise as far as our future well-being is concerned. Market decisions tend to be oriented to the present, with little concern for consequences.

We need to find ways that encourage creativity on the basis of the future well-being of the whole, not just of the separate fields. The greatest art, East or West, was not produced when the artists set the agenda, but when patrons insisted on certain standards.

A creative person must have a great deal of curiosity and openness on the one hand, and an almost obsessive perseverance on the other. How can we increase the number of people with both these characteristics?

Biological inheritance is only part of the story. Early background has a significant effect. Interest and curiosity tend to be stimulated by positive experiences with family, by a supportive emotional environment, by a rich cultural heritage, by exposure to many opportunities, and by high expectations. In contrast, perseverance seems to develop as a response to a precarious emotional environment, a dysfunctional family, a feeling of rejection and marginality. Creative individuals seem more likely to have been exposed to both circumstances.

A milieu that encourages both solitude and gregariousness may boost creativity. Children who have not learned to tolerate solitude often fail to develop enough in-depth involvement in a domain and tap opportunities to reflect and incubate ideas. On the other hand, children who are too shy and reclusive find it difficult to sell their ideas to others.

A certain flexibility about gender roles is likely to help. If a child is too strongly socialized to act in terms of a strict gender stereotype, its creativity is likely to be inhibited. A child who is encouraged to question, is likely to develop a problem-finding attitude. A child who is introduced to inductive reasoning may have an advantage in making sense of the world. Above all else, it helps to become involved in a domain early.

Even when not directly integrated in one's work, other domains contribute to the overall mental life of creative individuals. Breadth of knowledge is one of the most important qualities that are being ignored today. Excessively, narrow specialization reduces the likelihood of making creative contributions that will enrich the culture.

Most of us deep down believe that a person who is creative, will prevail regardless of the environment. But this is not really true. Circumstances do matter. Favourable convergences in time and place open up a brief window of opportunity for the person who, happens to be in the right place at the right time.

The author lists major elements in the social milieu that can encourage creativity: *training, expectations, resources, recognition, hope, opportunity, and reward.*

- A society that can match effectively opportunities for training with the potential of children can greatly improve creativity.
- Expecting high performance is a necessary stimulus for outstanding achievement and hence for creativity. High expectations should start within the family, continue in the peer group, in the school, and in the community at large. But excessive or unrealistic expectations must be avoided.
- Resources are crucial for creativity to develop. Yet excess resources also can diminish creativity. When everything is comfortable, the desire for novelty turns to thrills and entertainment, rather than a sharp focus on problem solving. If we wish to encourage creativity, we have to make sure that material and intellectual resources are widely available to all talented and interested members of society. Yet we should realize that a certain amount of hardship, might have a positive effect on their motivation.
- Potentially creative young people have to be recognized by an older member of the field. Otherwise, motivation will decrease with time. Training, expectations, resources, and recognition will be of no use, if young people have no hope of using their skills in a productive career.
- Rewards – both intrinsic and extrinsic – help creativity to blossom. Though few creative persons are motivated by money, the importance of money cannot be denied. Money gives relief from worries, and makes more time available for one's real work. One can buy necessary materials, hire help if needed, and travel to meet people from whom one can learn.

The organization of knowledge is especially important when it comes to passing it down to the next generation. To be creative, a person must first understand the domain. If the knowledge in the domain is not comprehensible, few young people will bother learning it, and thus creativity will be less. How should knowledge be transmitted? Rigid ways of teaching can discourage innovation. But in some cases, rigidity does seem to matter. Which method is more likely to boost creativity? The answer probably lies in the unglamorous middle ground. To cope well with numbers it is essential to automate as many mental operations as possible. And this requires some memorizing and practicing. On the other hand, to use numbers effectively in real life, one must also have a good intuitive grasp of how to approximate, how to round, when and how to use different operations. In short, there is no single right way to teach a domain. The way knowledge is transmitted should be appropriate to the skills of the learner.

Whereas experts in a discipline usually love what they do, beginners see only the drudgery of the discipline. So one obvious way to enhance creativity is to bring as much as possible of the flow experience into the various domains. The joy of discovery needs to be communicated effectively to young people.

Enhancing Personal Creativity

Each person has, *potentially*, all the psychic energy needed to lead a creative life. But there are many obstacles that prevent many from expressing this potential.

Some of us are exhausted by too many demands, and so have trouble activating our psychic energy in the first place. Or we get easily distracted and find it difficult to protect and channel whatever energy we have. Other challenges are laziness, inability to control the flow of energy and not knowing what to do with the energy one has.

In terms of using mental energy creatively, perhaps the most fundamental difference between people lies in how much uncommitted attention they have left over to deal with novelty. When survival needs require all of one's attention, none is left over for being creative.

But often the obstacles are internal. Most of us invest bulk of our attention in monitoring the self, or threats to the ego or in pursuing selfish goals. To free up creative energy we need to let go and divert some attention from the pursuit of the predictable goals that we are naturally inclined to pursue and use it instead to explore the world around us on its own terms.

So the first step toward a more creative life is the cultivation of curiosity and interest, that is, the allocation of attention to things for their own sake. How can interest and curiosity be cultivated?

- *Try to be surprised by something every day.*
- *Try to surprise at least one person every day.*
- *Write down each day what surprised you and how you surprised others.*
- *When something strikes a spark of interest, follow it*

To sustain curiosity, we must learn to enjoy being curious. When there is nothing specific to do, our thoughts soon return to the most predictable state, which is randomness or confusion. We pay attention and concentrate when we must – when dressing, driving the car, or at work. But when there is no external force demanding that we concentrate, we lose focus. Our mind falls to the lowest energetic state, where the least amount of effort is required. When this happens, a sort of mental chaos takes over. Unpleasant thoughts flash into awareness, forgotten regrets resurface, and we become depressed. Taking refuge in passive entertainment keeps chaos temporarily at bay, but the attention it absorbs gets wasted. On the other hand, when we learn to enjoy using our latent creative energy, we not only avoid depression but also increase the complexity of our capacities to relate to the world. The author suggests some practical steps here:

- *Wake up in the morning with a specific goal to look forward to.*
- *If you do anything well, it becomes enjoyable.*
- *To keep enjoying something, you need to increase its complexity.*

After creative energy is awakened, it is necessary to protect it. We must avoid distractions and escape outside temptations and interruptions. If we do not, the concentration will break down. Then we return to our vague, unfocused, distracted state.

One must remain open and focused at the same time. Before we have discovered an overriding interest in a particular domain, it makes sense to be open to as much of the world as possible. After we have developed interest, however, it may make more sense to divert all the energy into that one domain. In either case, the important thing is not to relinquish control over creative energy so that it dissipates without direction.

What can we do to build up habits that will make it possible to control attention so that it can be open and receptive, or focused and directed depending on what the overall goals require?

Make time for reflection and relaxation. Keeping constantly busy is certainly much better than indulging in self pity or being lazy. But constant busyness is not a good prescription for creativity.

Find out what you like and what you hate about life. It is astonishing how little most of us know about our feelings. There are people who can't even tell if they are ever happy, and if they are, when or where. In contrast, creative individuals are in very close touch with their emotions. They always know the reason for what they are doing, and they are very sensitive to pain, to boredom, to joy, to interest, and to other emotions. They are very quick to pack up and leave if they are bored and to get involved if they are interested. And because they have practiced this skill for a long time, they need to invest no psychic energy in self-monitoring; they are aware of their inner states without having to become self-conscious.

Start doing more of what you love, less of what you hate. After a few weeks of self-monitoring, sit down with your diary or your notes and begin to analyze them.

The only way to stay creative is to organize time, space, and activity to our advantage. It means developing schedules to protect our time and avoid distraction, arranging our immediate surroundings to increase concentration, cutting out meaningless chores that soak up psychic energy, and devoting the energy thus saved to what we really care about. It is much easier to be personally creative when we maximize optimal experiences in everyday life.

Personality is nothing but a habitual way of thinking, feeling, and acting, as the more or less unique pattern by which we use psychic energy or attention. Some traits are more likely than others to result in personal creativity. To change personality means to learn new patterns of attention, to look at different things, and to look at them differently; to learn to think new thoughts, have new feelings about what we experience.

Develop what you lack. All of us specialise, which usually means that we neglect traits that are complementary to the ones we have developed. Developing multiple perspectives can enrich our life considerably.

Shift often from openness to closure: Perhaps the most important duality that creative persons are able to integrate is being open and receptive on the one hand, and focused and hard-driving on the other.

Aim for complexity. A complex system is differentiated, has many distinctive parts but it is also a very integrated system. The several parts work together smoothly. Evolution appears to favour organisms that are complex; i.e., differentiated and integrated at the same time.

Find a way to express what moves you. Creative problems generally emerge from areas of life that are personally important.

Look at problems from as many viewpoints as possible. When we know that we have a problem, consider it from many different perspectives.

Creative individuals do not rush to define the nature of problems. They look at the situation from various angles first and leave the formulation undetermined for a long time. They consider different causes and reasons. Because they pause to consider a greater range of possible explanations for what happens to them, creative people have a wider and less predictable range of options to choose from.

Figure out the implications of the problems. Creative individuals experiment with a number of alternative solutions until they are certain that they have found the one that will work best. As soon as we think of a good solution, we should develop the habit of thinking of an opposite one. While being quick and consistent is often desirable, if we wish to be creative, we should be willing to run the risk of sometimes seeming indecisive.

Implement the solution. Creative problem solving involves continuous experimentation and revision. The longer options are kept open, the more likely it is that the solution will be original and appropriate.

Personal creativity consists in changing the domain of personal life, of the rules that constrain psychic energy, the habits and practices that define what we do day in, day out. If we can dress, work and conduct our relationships more effectively, the quality of life as a whole will improve.

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