

THE IMPORTANCE OF CREATIVITY IN EDUCATION

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Abstract: *This paper submits, in its first part, some considerations on the creativity-brain-learning triad and defines the creative person, creative teacher and creative student. The North Axis principles, as a means to stimulate creativity, yield the content thereof. As follows, the author explains the stock-market-related simulation, as a didactic modality to initiate the students in the secrets of the investment in the stock exchange. The conclusions highlight the importance of practical activities for the economy of education.*

Key words: *creativity, education, brainstorming, north axis, simulation.*

1. Introduction

Creativity implies more than simply involving imagination or fancy. It signifies and brings along novel, original and valuable outcomes for the individual or society. While the imaginative person is a dreamer, the creative person moves the world forward. To this effect, (s)he needs to have a powerful background of information and education, a powerful basis of differentiated assessment systems, whereby the production of values should be possible and assessable.

The preoccupation for creativity is based on brainstorming, synectics, Philips 6-6. The interest in creativity has extended over industry, business, education, research, science.

Creativity benefits from extensive extra-psychological supports: reconsideration of Occidental cultures, of relaxation, medication techniques; recourse to archaic thinking with its dominant features, related to myth, archetype, image, lateral thinking;

preoccupation for language and unconventional communication, based on analogy, metaphor, synecdoche. In recent times, a new science emerged, neuropedagogy, which emphasizes the asymmetry and complementariness of the cerebral hemispheres, the bioelectrical rhythms of the brain, the synaptic mediators, the lateralization dominance.

The information are not equally managed by the two hemispheres: the left one is mostly verbal, logic, serial, sequential, semantic, it quenches the orientation reflex, it has two truth values and it operates in digital code; the right one is spatial, it deals with itineraries, locations, human figure and expression, being affective, it operates in analogical code, it is synthetic, it makes remote associations and thinks most times laterally, divergently, metaphorically.

Albeit rehabilitated by neurologists, the right hemisphere and its reserves remain the great promise and challenge to fundamentally change the perspectives for

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the pedagogy of the future, which will probably turn much more towards image, kinaesthesia, motor skills, analogy, metaphor, intuition and sensitiveness. We are witnessing a return to archaic thinking powers and to an offensive of the image, on the verge of counterbalancing the domination of words.

The brainstorming suspends or defers critical assessment, creates a relaxation state. A complete corpus of methods was organized for the purpose of neurolinguistic programming (PNL), with a view to unlocking part of the huge potential of the brain, corpus whereby creative learning becomes the dominant of this millennium's pedagogy. [1]

2. Professor' creativity and students' creativity

2.1. Creative Personality

The creative person stands out by: his/her enormous work capacity and mental minimization of the effort; patience, associated to long-term interests; a great curiosity turned into the motor of all existence; a good control of emotions, the large energy consumptions of the creative process being obtained by focalization and redistribution; high tolerance to ambiguity.

The factors that stimulate the creative process are: creative climate, composed of group and mentor; collateral passions; any kind of games; contradictory discussions with one's colleagues; ensuring the tranquillity necessary for meditation during the periods of creative trance.

2.2. Professor's creativity

Teaching staff are among the professionals who oppose novelty with

greater obstinacy than the specialists acting in other sectors. Innovation in education is easy to disseminate by cutting-edge means, yet is hard to assimilate. There is a first contact with novelty, which triggers interest and documentation; its mental assessment follows; then its application on a small scale; thereafter, its assimilation and integration; finally, progressive contagion generates chain reactions, in the professional group members, whereby the change generalizes.

Didactics shows the normative character of its mandatory prescriptions; nevertheless it admits that the excess of normality paralyzes the professor's liberty and creativity.

For the **creative professor**, the vocation for innovation is fundamental: The teacher must be himself/herself passionate of the field, eager of novelty, keeping intact his/her curiosity and interest in everything that happens within his/her circle of influence. The senses inherent to knowledge are more important than knowledge itself, as curiosity and the need to comprehend are specific to the child and human being. When they are not manifest, this does not mean they succumbed, only they were temporarily blocked, by an excess of information, inadequately transmitted. More than (s)he needs the professor, the student needs to feel the model, the mentor, who teaches the knowledge worth assimilating, for being truly relevant. The inciting-personal didactic style arouses the interest to the extent his/her own interest is vivid and unaltered.

2.3. Students' creativity

The highly abstract knowledge started from extremely concrete problems. The human being's appetite for philosophy is

fervently present from an early age, as the significance, the relation of the parts to the whole, the harmony of the particular within the universal, the search for sense are more intense in childhood, when the pressure of the unknown cannot counterbalanced by extensive conceptual-integration systems, hence anxiety, fear, dependence, yet the need to know.

Modern school increasingly associates school creativity with a pedagogy of the differences, because there is no standard pupil. (S)he may manage the information primarily acoustically, visually or kinaesthetically; (s)he may be a boy or a girl, right-handed or left-handed. (S)he may evince psychic homogeneity, or strong asymmetry between cerebral hemispheres, between the sensorial and logical plans, between memory and reasoning or between types of thinking (reproductive or creative, analytical-synthetic, vertical-lateral).

T. Gordon and N. Burch identify twelve barriers to communication:

1. To command, order, direct
2. To warn, menace
3. To give piece of mind, sermonize
4. To give advice, to offer solutions or suggestions
5. To teach, lecture, give examples
6. To judge, criticize, disapprove
7. To nickname, ridicule
8. To interpret, diagnose
9. To praise, agree
10. To assure, sympathize, support
11. To ask, investigate, interrogate
12. To withdraw, be sarcastic.

As solution to the “non-acceptance” language, the authors propose “Active Listening”. “Active Listening”, opposed to passive listening (silence), implies the interaction with the pupil and offers him/her the proof of being understood by the teacher (feedback). The teachers who

apply “Active Listening” note that it increases the profitable time to teaching and learning. Here’s how:

- a. Active Listening helps pupils manage and subside strong feelings.
- b. Active Listening helps pupils understand they need not fear their emotions.
- c. Active Listening helps pupils reach to the real problem.
- d. Active Listening facilitates problem solving by pupils.
- e. Active Listening places responsibility on pupils.
- f. Active Listening makes pupils more receptive to and willing to listen to their teachers.
- g. Active Listening promotes a closer, deeper relation between teacher and pupil. [2]

3. Creativity methods

3.1. Didactic brainstorming

The moderator is in the foreground, as (s)he is followed step by step by students in their idea discovery process. (S)he carefully manages his/her information, gradually increasing the complexity of the problem under consideration. The moderator arrogates thereby to himself/herself the role of expert. The purpose is to develop solutions on various levels, respectively not to choose rash or global approaches.

The process lasts circa 40 de minute, preferably with four to seven participants.

The gradual distribution of information prevents the participants’ too rapid and premature focalization on a certain settlement path and, therefore, their overlooking possible alternative solutions. The moderator will enunciate the overall problem only at the end of the process,

advancing thereby, based on the ideas exposed by then, a comprehensive solution. The moderator guides the group step by step towards the actual problem, dividing the problem-solution process in several partial stages, rendering available ever newer and detailed information. After unveiling each new piece of information, the moderator leads a new partial stage of brainstorming.

3.2. Six thinking hats

According to Noach, throughout the process, depending on the approach of the problem, the participants symbolically wear six hats of different colour. Each hat stands for a certain problem-settlement perspective. The hats may be changed, with a view to exploiting their associated prospects, and to approaching a problem from all points of view.

The white hat represents analytical thinking, objectivity and neutrality. The one who wears it simply collects information, without assessing them. The red hat represents personal sensitivities and subjective opinion. All feelings are given free reign. The black hat represents all objective-rational arguments, including doubt, fears, risks. There is not about feelings. The yellow hat represents objective-positive features, namely the chances and advantages, the hopes and goals. The green hat represents new ideas, creativity and alternatives, beyond what already is. The blue hat represents order, control and organisation, as well as perspective preservation; and brings together the individual results obtained on a metaposition. In this way, various viewpoints are registered consecutively and become known, achieving withal an extension of the personal analysis-perspectives. [4]

3.3. Visualisation

In the case of visualisation, you need fancy to a positive image of the desired result. You need resort to your own anticipative power and imagine in as much detail how the result should look like. Appeal to your imaginative power, allowing genuine moving pictures to run in your imagination. The remote control is in your hand: you can stop the projection whenever you want, you can resume the movie and even remake it. This technique makes you want to transpose your ideas into practice. These imaginary successful movies stimulate the availability and necessary forces to make the imagined states come true. [4]

3.4. North axis principles

Geniuses create very much. Bach would compose a cantata every day, complying with this rhythm, even when he was tired or ill. Mozart composed over 600 creations, Einstein wrote 248 works, Rembrandt achieved 350 paintings and 2000 drawings, Shakespeare wrote 154 sonnets, and Edison achieved 1093 patented inventions. The latter needed 9000 experiments to perfect the light bulb and 50000 to create the electric battery. On being asked why he took forward the attempts to discover a resistant filament for the light bulb, after having failed thousands of times, Edison said he did not understand the question.

Geniuses create very much because they think productively. The productivity of thought implies generating multiple ideas. In order to think productively, we need organize our thinking according to some principles, called *North axis*, which we will detail as follows:

- a. defer judgement, when generating ideas,
 - b. generate as many ideas as possible,
 - c. put down the ideas as you produce them,
 - d. elaborate new ideas or improve the older ones.
- a.** When searching for ideas, by oneself or in group, it is important not to judge, not to evaluate, not to criticize ideas as you generate them, because nothing kills creativity more than critical thinking. There is characteristic of the human being to try to find solutions and to discover without why the respective solutions are not valid. Thinking without value judgement is dynamic, flowing. In this way, the ideas stem from each other, each bringing along another and creating Fibonacci's series.
- b.** The secret of deferring value judgement while generating ideas is to split thinking into two stages: possible thinking and practical thinking. The former implies random generation of ideas, without evaluation or judgement. It is important to generate as many ideas, without assessing their value altogether.
- After having created as many ideas, pass to practical thinking, to evaluating and judging ideas, in order to find the most important ones, which are worth considering.
- Edison would guarantee productivity, by imposing both for himself, and for his assistants, a certain share of ideas. He undertook to make a minor invention every ten days, and a consequential one, every 6 months. You can act similarly, setting a quantitative level to observe. If you work by yourself, you might make it a duty to find 40 solutions; and if you work in group, you might make it a duty to find 120 solutions. Endeavouring to
- comply with the imposed share, you cancel your critic qualities and you put down everything that comes to your mind, both obvious and original ideas. One third of these ideas will be the old ones, known by everybody; another third will be interesting ideas; and the final third will be complex, original ideas.
- c.** Focusing on a certain figure, you set out to make a list of ideas. It is worth nurturing the habit to make lists when searching for ideas, when making brainstorming.
- Lists will help you organize your thoughts, streamline your thinking, maintain your focus and they will compel you to resort to alternative solutions. The lists of ideas also help you remember the solutions you figured out. Psychologists proved that we can keep in mind a number of ideas ranging between five and nine. After 12 seconds, the capacity to remember diminishes, and after 20 seconds, the information completely disappears, unless put down. Putting down ideas and making lists of ideas increase the speed of thought and the creativity. The lists of ideas are a simple method to enhance thinking skills.
- d.** Enrich your own ideas and the others', by developing and analyzing them in detail. Subsequent to generating a manifold of ideas, develop, modify and combine them. Develop your ideas, by resorting to the 9 principles of creative thinking, elaborated by A. Osborn and B. Eberle in SCAMPER.
- S** Substitute. Can I substitute something?
- C** Combine. Can I combine something with something else?
- A** Adapt. Can I adapt something to my subject?
- M** Modify. Can I multiply something?

P Place. Can I place it in another context?

E Eliminate. Can I eliminate something?

R Reverse. Can I rearrange it? [3]

3.5. Do not think about the problem

Solid knowledge in a field can be a barrier to creativity, as it canalizes thinking in a certain way. If you want to create something, for instance a product, do not think about it. An abstract definition of the problem can be the key to creativity and innovation, better than a classical definition. One can start from abstract structures, which will be progressively transformed into less abstract representations, until they come to stand for a real case. If you think about the problem, by turning it into an abstract situation, you have great chances to overcome the barriers of conventional solutions. Routine is the great enemy of the minds and it installs quite quickly therein. By rendering the problem more abstract, you avoid its analysis from the classical perspective, which takes hold of your mind. Stages to follow:

- a. Give an abstract definition to the problem
- b. Search for ideas through the method of brainstorming
- c. Redefine the problem more abstractly, then search for as many solutions
- d. Analyze the real problem. Review the ideas and solutions of the two abstract problems and use them for generating solutions.

Graham Bell started to think about the invention of the telephone, after having read a presentation in German of an invention which, as Bell thought, had the functions of a telephone. After having invented the telephone, Bell found out he had misunderstood the explanations, as the German invention had quite another utility. Likewise, the ideas and solutions of abstract problems can represent the

necessary stimuli for overcoming the barriers of the mind.

The more ideas you put down and review, the more complex becomes the information network available for your brain. Imagine your ideas as atoms clinging to your brain. When you think about something, these ideas are set in motion in the unconsciousness. The more intense you think of a problem, the more information you send to the long-term memory and the more thoughts you set in motion. Unconsciousness never rests. When you decide to give up an idea, when you abandon it, the unconsciousness does not stop working. The idea freely moves therein, combining and recombining thousands of times. Most combinations are of no value, yet there is a certain combination valued by unconsciousness and sent to consciousness as an *idea out of the blue*. [3]

4. Stock exchange simulation

Good ideas are not born from nowhere, in a vacuum; they occur every time in a diversified frame of connections and in a complex intertwining of relations. The looming out of ideas is not enough. The participants in the overall process, both professors and students, need be convinced of the ideas under consideration, so that their implementation might be launched and the afferent resources, granted.

The author highlights a modality to learn with the students the secrets of the investment in the stock market, which he has discovered himself and called *stock exchange simulation*.

I am the adept of the principle that, in order to learn to swim, you must know the moves and therewith jump into the water and swim. I apply this principle with the students, also in the case of the stock exchange simulation. Practically, teams of

3 students are formed, and each team has 100000 virtual lei, which they invest by buying shares at the 1st and 2nd category of the Stock Exchange of Bucharest. As a group is composed of 24 students, 8 teams are thereby formed, which compete with each other, with a view to obtaining higher profit on the stock market. After 7 weeks, the teams sell the shares; and those who obtain higher profits win. Thus, the winning team members receive 2 points at the examination; the members of the team ranked second receive one point. Collaboration (which is, I dare say, more important than competition) is thereby enhanced, within the teams consisting of 3 students each. Practically, how do we act?

In the 4th week of the semester (after going through the courses: Defining Elements of the Capital Market, Quotation of the Stock Exchange and Fundamental Analysis, which aim at initiating students into the Stock Exchange) during seminar, in front of the computers, the students fill in a table that comprises:

No.	Denomination	JSC	Symbol
Regular	average price	Quantity	Value

If we multiply the regular average price with the quantity, we obtain the value, namely the amount of lei invested by students in the company X. I further mention that the average price refers to the price of the shares purchased by students. If the students, at the rubric *quantity* do not take an integer number, they are disqualified. Likewise, they are allowed to exceed 100000 lei not even by one ban. The total invested amount must get as close as possible to 100000 lei. For instance, 99999, 98 lei were invested.

After 7 weeks, the table shall be filled in again, only the regular average price and implicitly value having modified. This time, the average price will be the selling price for the shares previously bought.

5. Conclusions

Group creativity has a diversified contribution of synergetic effects: stimulation of the learning processes, higher and better targeted student motivation, enhanced stimulation and acceptance of the university culture, higher attention and preoccupation for students.

I am the adept of the principle that a gram of practice is worth tones of theory. Therefore, during the examination, the percentage of the practical subjects is 60%. I dare say a professor's activity should refer not only to the actual teaching of the content, but also to its application. The content covers data, information and the actual subject. The application is about transformation and maturity. In other words, the content is the theory, and the application is the practical activity. The content generally refers to what is being discussed during class, and the application, mostly to what is being applied from the learnt content. The former concentrates on *knowledge*, the latter on *to be* and *to do*.

The professor's main preoccupation is not the content, but its practical application, in life. The difference between teaching in the light of the content and teaching in the light of application is amazing. The teacher who relies on content thinks his/her responsibility is to go through the course and to explain it. The teacher who relies on application nurtures the belief (s)he is responsible with highlighting the relevance of the submitted data, with a view to determining positive changes in the students' life. At least 50% of the taught lessons should focus on application. When teaching a lesson, what really matters is not only the content, but also the sincerity and conviction of its transmission, as well as the possibility of its application. Often, the way in which we express ourselves bears more persuasiveness than words themselves.

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