

Creativity and Motivation- Understanding the Principles: A Necessity for advancing Medicine, Research, Education and Life.

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There is confusion about the term creativity as well as innovation and motivation. We may get the impression that these are not related except to certain classes in a given society such as high caliber researchers and discoverers and artists. Since this is a newly explored field as it became formulated in the 1970s the fact that creativity is crucial in any field including medicine, education, parenting, human developments and every field in life. Nuclear medicine is also relatively new and widely open for innovations and expansions. Although these innovations are not limited to certain country, some contribute much more than others. The specialty needs continuous innovations that are culture based given the culture diversity of the world which negates making importing research a rule. Hence there is a need to understand what makes certain individuals, teams, institutions and societies creative. Exploration of creativity with talks, articles and other resources is important to awaken creativity in daily life and in the nuclear medicine field.

A lot of institutions are asking of their people right now: be more creative and innovative and come up with the next big idea. Understanding principles of creativity and innovation helps the individual create imaginative solutions to challenges both huge and small. This will help the person discover that not only can you increase your creative options but also encourage truly innovative solutions to emerge, benefiting him/her, team and society by either developing the individual creative muscle or finding out that he/she actually have one and identify your individual style of creativity. In an important book titled "The rise of the creative class" by Richard Florida published in 2002, the "creative class" is found in a variety of fields from engineering to theater, biotech to education, architecture to small business. They have already had a huge developmental and economic impact. In the future they will determine how the workplace is organized, what companies will prosper or go bankrupt, and which cities will thrive or wither.

Regarding the definitions, creativity is an idea, response or product that is novel (different from what has come before) and appropriate to the problem (useful or valuable in some sense). It consists largely of re-arranging what we know in order to find out what we do not know. Simply creativity is

thinking up new things while innovation is doing new things.

There are no separate forms of creativity for artists, musicians, poets or scientists. Creativity is not just for artists, but for any of us who are called upon to think differently, view challenges from new perspectives and indeed come up with new ideas to make our team, institution, society more advanced. Creativity is a trait which human beings possess making them potentially creative, provided creativity is cultivated.

Creativity is dependent on the task whether algorithmic or heuristic. An algorithmic task is straight-forward in which there is little or no room for creativity. On the other hand heuristic task is open ended and non straight forward which requires problem solving by experimental methods especially trial and error. Example of algorithmic task is adding some numbers. Only one correct answer is possible and it is straight forward and does not need trial and error exercise. On the other hand, if the task is to solve a problem such as attenuation effect of breast on cardiac imaging, it represents an example of heuristic task since many solutions for such a task could be thought of and tried. It is an open ended task and requires creative thinking, generating ideas, trial and error exercise and assessment of outcomes. Creative thinking used is not a talent but is a skill that can be learnt. It contains two mutually exclusive mental activities, diverging thinking which leads to generating lots of options and ideas and converging thinking which includes judging, assessing options, focusing and making decisions.

Creativity requires three components: task motivation, domain relevant skills and creativity relevant skills. All the three must be present for creativity to emerge. Regarding task motivation it is the activation or energization of goal-/task-oriented behaviour. There are two types of motivation, intrinsic and extrinsic. Intrinsic motivation indicates doing task for its own sake because of intrinsic interest and is more conducive to creativity while extrinsic motivation indicates doing the task as a means to some extrinsic goal such as money, satisfying requirements etc. Overall task motivation depends on both the individual's initial attitude towards the task and presence or absence of social constraints.

Editorial

Several factors are known to affect creativity relevant skills. These include training, experience in generating ideas and personality characteristics. Personality characteristics include cognitive style characterized by high mental energy, ability to break habits and sense about when to leave a stubborn problem for a while.

Factors affecting creativity skills include personality characteristics and social factors. Positive Personality characteristics include broad interests, independence of judgment, self confidence, self acceptance and adequate level of intelligence. Beyond a certain level of intelligence (120-125), being highly intelligent does not make a difference in creativity as far as more positive personality characteristics are present. Personality Characteristics are affected by Parent character. Highly creative individuals have parents with their own interests, children are not the centre of their lives, less critical of the child, less conventional parenting style allowing freedom to children and respect to children. Authoritative parent, particularly authoritative mother, is associated with higher grades & less creativity.

Social factors affecting creativity skills include atmosphere which is the single most important factor for conducting or killing creativity, expecting evaluations and restriction of choice and expected reward. Although creativity is rewarded and rewarding, prior knowledge of reward as a motive to accomplish a task may undermines creativity particularly on the long run.

Atmosphere facilitating creativity is characterized by challenge, freedom, idea support, trust/openness, playfulness/humour, dynamism, allowed idea time, risk taking and happiness. On the other hand atmosphere that is loaded with constraints surveillance, evaluations, mistrust, and disrespect kills creativity and lower quality of work and productivity. These parameters should be understood and modified for creativity to happen.

Culture that stimulates creativity and innovation can be created and maintained in teaching, research and other organizations. Determinants of organizational creativity and innovation include organisational climate, organizational culture, structure, resources and skills and leadership style. In fact creating a culture of innovation has become an objective in many institutions and requires new thinking, making individuals aware of their creative styles and preferences, encouraging them to develop their cognitive skills and allowing their intrinsic motivation to flourish in a stimulating climate. Ormrod in 2003 explained that motivation in education can have several effects on how students learn and how they behave towards subject matter. It directs behaviour toward particular goals, leads to increased effort and energy, increases initiation of and persistence in activities, enhances cognitive processing and leads to improved performance. Because students are not always internally motivated, they may need situated motivation which is found in environmental conditions that the teacher creates. Accordingly there is a need for

educators at all levels to know principles of creativity and motivation.

Creativity goes through phases starting with observation & preparation followed by incubation & imagination, illumination, verification, self assessments and ending with joy & passion. The outcome of creativity is always a combination of simplicity (problem solutions, products) and joy.

The value of understanding creativity and awareness of what conducts and what undermines it helps motivating others such as employees, colleagues, students and children. It allows also evaluating work places to determine whether the atmosphere and practices are suitable for creativity. It may lead to change in our practice when dealing with each other in the family, at work and at the society at large and using different methods based on the type of task. Creative people should try to avoid society practices that inhibit creativity and keep moving creatively for a better outcome, advancing the society and happier life. Creative individuals can be identified and care for them as they are asset for societies.

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