

"Eureka!"

The Act of Creation

"This is the legendary exclamation made by Archimedes and hence the term, 'Eureka Act!' This is the process which has led to brilliant discoveries..."

Creativity can be roughly defined as the ability to make or otherwise bring into existence something new, whether a new solution to a problem, a new method or device, or a new artistic object or form. A creative person is usually very intelligent in the ordinary sense of the term and can meet the problems of life as rationally as anyone else can, but often he refuses to let only the intellect rule. On the contrary, he relies very strongly on intuition. However, the converse is not always true. All intelligent people may not be creative. A distinction can be made between the convergent thinkers, the analytical reasoning measured by intelligence tests and divergent thinking which displays a richness of ideas and originality of thinking. It seems that a mix of both convergent thinking and divergent thinking is desirable in different degrees depending upon the tasks and problems under consideration.

Divergent (or creative) thinking has been defined as an activity that leads to new information or previously undiscovered solutions, rather than to a predetermined, correct solution (as in convergent thinking). The extreme case of convergent thinking is an algorithmic approach to problem solving, which is at the root of all computer programs and is the most mechanical approach to problem solving. Discovering a new algorithm could, however, be a creative exercise especially if it is in some ways better at solving the problem.

Real life problems often require flexibility, originality and inventiveness especially for problems in which the individual must apply his own unique experience and context.

Many creative people enjoy and take a deep interest in apparent disorder, contradictions and imbalance. And from this apparent chaos and uncertainty they create organized bodies of knowledge often by observing patterns and relationships not seen by others. Several sixteenth century astronomers, before Kepler, have observed the movements of the planets. Kepler explained them, laying down the principles on which Newton later built. Newton defined the laws of gravity, which other scientists later refined. The empirical evidence for the 'theory of relativity' was available for fifty years before Einstein. Many laboring scientists had all the data, but it was Einstein's brain that made all the relevant right connections.

Those who like to analyse the process of creative thinking tend to organize this as comprising four progressive stages. In what may be described as the first stage (preparation), the thinker assembles and explores the available information and data and perhaps makes some tentative preliminary decisions about their value in solving the problem at hand. The problem may not always be a grand scientific bottleneck. It could be part of daily life, may be a personal, emotional difficulty that needs expression or resolution.

The next stage is called incubation, in which he mulls over possibilities and shifts from one to another relatively free of any rigid, rational or logical preconceptions and constraints. Incubation seems to be partly unconscious, proceeding without the individual's full awareness.

The next stage of illumination occurs when the pieces of information fall into place and a definite decision is reached about the result or solution. This is followed by the final stage of verification, refinement or polishing which is the process of making relatively rather minor modifications in committing ideas to final form. Although the four phases have been ordered in a logical sequence, in reality they may not be so well demarcated but may vary widely and proceed in different orders from one instance to another. Also the time spent at the various stages may vary. Sometimes the incubation stage, where different alternatives are being considered may last several years.

The scientist relies more on disciplined, logical thinking to lead him into new directions whereas the artist is more imaginative and expressive. However, all scientific discoveries are conscious, logical and reasoned. Scientists and mathematicians can often be very creative when they are asleep or dreaming. Kekule, who proposed the cyclic structure for Benzene found it in a dream. Many mathematicians have dreamt of solutions to difficult problems and just wrote them down after waking up. Clearly their minds were seized of the problem and were constantly working on them. So it was probably not a dream in the usual sense, but a continuation of their thinking effort while asleep. That being mentally uninhibited can lead to creative experiences was stated by Einstein in a lecture that he delivered at Berlin in 1918 where he stated: "The supreme task of the Physicist is to arrive at universal elementary laws from which the cosmos can be built up by pure deduction. There is no logical path to these laws; only intuition, resting on sympathetic understanding of experience can reach them." Later he is reported as writing that these laws, the universal elementary laws from which the cosmos can be built are arrived at by "the free inventions of the mind" rather than by observation, experimentation or logical inference alone. However, these free inventions of the mind have to pass the rigorous test of reality and experimentation. But sometimes the expression can precede the observation, such as when Dirac predicted the positron long before it was experimentally discovered.

However, the inventor, Thomas Edison, whose creativity resulted in the gramophone, the electric light bulb and the means to make motion pictures held the view that genius was only one- percent inspiration and the rest ninety-nine percent required perspiration.

Clearly objective standards for evaluating the degree or extent of creativity are lacking and inter comparisons may not be easy. Even then a number of psychometricians have attempted to develop tests that measure creative abilities, involving such test items as

unusual or multiple word associations, the composition of fable endings and the description of unusual uses or improvements for ordinary objects or implements. And while quantitative exactitude may not be possible, at least a qualitative framework can be available. In fact a relatively new branch called 'Fuzzy' mathematics has been developed to respond to the problem of bringing some precision to apparently qualitative parameters. And now we do have gadgets and devices such as washing machines, cameras, televisions based on fuzzy logic. So maybe creativity could also be measured although with some 'fuzziness'.

Philosophers and researchers have been trying to find answers to the central question: whether the creative problem is solved by the conscious mind or by the unconscious mind and, therefore, whether we can actually be trained to be creative.

My own view is that we are intrinsically capable of creative and innovative activities and do them unrecorded throughout our lives. However, since society rewards compliant people, we tend to let our creative abilities fall into disuse.

But in the coming years there would be greater value to innovation and creativity and indeed they would become key ingredients for flourishing and thriving. While the Tit' may survive in terms of the Darwinian theory, to actually thrive and flourish one would have to be creative.

Even in the financial sense in the Intellectual Property regime of the future, people who are creators and authors of intellectual property would be the leaders.

Psychological experiments in the fields of motivation and learning have demonstrated that novelty is a great inducement to action. There is, it seems, a continuous and perennial tension in higher organisms between the establishment and maintenance of environmental constancies and the interruption of achieved equilibria in the pursuit of new possibilities of experience. Psychological studies of highly creative people have demonstrated this tension in terms of such dualities as intellect and intuition, the conscious and the unconscious, mental health and mental disorder, the conventional and the unconventional and complexity and simplicity.

It would be desirable to foster creativity and while there may be a difference of opinion whether this can be done, definitely an attitude to appreciate creativity can be created and everyone can be stimulated to be at least a little more creative. And sooner than later these attempts at creative thinking and expression would yield significant giant steps as well. And once such a spirit has been developed and the sparks ignited, creativity can continue till very late in life, as the works of several writers have shown.

So, next time you get a new idea or you think differently from the rest of the group do not be apologetic about it. Say what you feel, record it somewhere and at your own pace follow it through. Who knows, one day the world will accept those thoughts and you would feel rewarded.

