Innovation and Conflict:

Finding Creative Solutions to Social Problems

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1. The French playwright, Eugene Ionesco, founder of the Theatre of the Absurd, said of his work: “Passions slumber in me that may explode, then be held in check again. Jets of rage or joy lie within me, ready to burst and catch fire. In myself I am energy, fire, lava. I am a volcano.”

The passion which inspired Ionesco to create is that which drives any great cultural achievement, the burning, smouldering fires of desire to build, to transform, to innovate. Without the passion there is no idea, no research, no pursuit of the new which will add to culture, transform it, and make life better. Passion is the starting point for innovation, but it must be complemented by the processes which support and shape development, by education providing the knowledge and skill, through which passion may be expressed, talent transformed into achievement and research directed toward the innovation which leads to development and progress. The recent UNESCO international science meeting on the preservation of life (December, 2005) phrased it as ‘How passion gives birth to innovation’.

2. It is generally accepted that innovation is a fundamental dimension of development and progress; whether it be in the sciences, humanities or arts, all depend on innovation to carry disciplines forward. But innovation does not occur in a vacuum; any systematic innovation comes from the application of new knowledge, the outcomes of research, the process for testing fresh ideas. This paper regards ideas as the starting point for innovation, the creative trigger which propels both research and innovation, or in every day terms, successful problem solving.

This paper identifies creativity with the development of new ideas and contends that the most effective mechanism for developing these is through individual acts of observation, perception and imagination. The argument is inductive, deriving a pattern of innovation across a range of problem solving which has resulted in constructive outcomes and proposing that the same approaches are relevant to resolving all types of issues including those related to security and conflict.

3. Leonardo Da Vinci has been celebrated in various contexts and particularly for his ideas about human flight. When we look at his drawings for flight, we see the examination of birds, their wings, their feather patterns, their bone structure, the shape and surface qualities of the wing and the muscular mechanisms which enabled them to move. Leonardo based his designs for flying machines on the close observation of birds and his drawings and sketches, recount the intense detail with which he recorded these.

Through observation, he recognized that the underside of the wing was curved inward and found that this allowed the bird to be kept aloft by the movement of air over it creating an uplifting force. His designs employed this observation and established a curved underwing as the basis of how machines might be kept in the air, a development built on by successive researchers until powered flight was achieved by the Wright Brothers. Leonardo's observations of his environment provided the starting point for his experimentation.[1]

If we were to systematically describe how Leonardo developed his ideas it would be: his observations of birds identified the nature of the concave underside of the wing; he interpreted this in the context of his enquiry, the search for flight, which lead to his discovery that movement across a concave shape produces a force against it; from this discovery he imagined how humans might fly and designed machines to enable this. The idea which he produced moved from observation (recording the raw data) to perception (understanding it in the context of his objectives and making a discovery) to imagination (considering what might be possible). His designs were a response to this sequence and resulted in something new (innovation).

4. In 1903, Orville and Wilbur Wright undertook the first controlled, motor driven flight, which proved the starting point for modern aviation. The Wright brothers developed the idea of a glider with movable parts in the wing assembly, to vary the shape of the wing surface in response to the flight conditions. This maximized the potential up thrust from moving air across the wing and enabled the flight position to be corrected in response to wind changes or the need to alter direction or speed. They mounted an engine on the glider and on December 17, 1903, they flew for 59 seconds, covering a distance of about 260 metres; the aeronautical industry was born. What was revolutionary about the Wright brothers work was neither the glider nor the engine, which both relied on existing technology; it was the shaping of the wing to allow a pilot to manipulate the aerodynamic impact on the structure; it was an issue of design.[2] The whole aircraft industry reflects the innovations which flowed from their research. When the Wright Brothers developed powered flight, they took Leonardo's observations a step further, developing a mechanism to alter the shape of the wing surface in flight, to control the impact of the air and vary the degree of uplift; they did so based on their observations of how birds change the shape of their wings during flight to achieve the movements they want to make. If we were to describe the development of their ideas it would be: observation-seeing how birds altered different parts of the wing to control the force of the air against it; perception-considering this in the context of controlled human flight; imagination-considering how this might be used to create controlled flight. Through experimentation, they developed a mechanism for altering the shape of the wing in flight and designed it into an aircraft.[3]

5. The English surgeon William Harvey was the first person to postulate the circulation of the blood, a fundamental of how we now understand the body. He came up with the idea after seeing the exposed heart of a live fish at the Convent Garden fish market; its pulsating rhythm reminded him of the large water pump on London Bridge which took water from the Thames and circulated it through the pipe system of the city. Harvey was

aware of blood flow through the veins and arteries of the body, but he was unable to explain how the flow was achieved. Considering this observation in the context of his surgical experience, Harvey imagined the heart as a pump, driving the blood around the body. He considered the possibility of the body as a closed system of circulating blood forced through the arteries by the pulsating heart.[4] Harvey developed his idea from an observation, he perceived it within the context of his own surgical experience and imagined the nature of how blood circulation occurred.

6 One of the greatest figures in scientific discovery, Sir Isaac Newton, proposed the idea that the tides were caused by the gravitational effect of the moon. Newton had been unable to explain the motion of the tides which rose and fell twice daily, and which demonstrated seasonal extremes. He had observed the changing phases of the moon on its monthly cycle, waxing and waning as it moved across the heavens. It occurred to him that there might be a parallel between the movement of the moon and the rise and fall of the tides which he imagined as the moon pulling at the earth across the heavens. He described the moon grasping at the earth with 'large ubiquitous fingers", a description for which he was criticized for introducing occult beliefs into science.[5] However fanciful the description might be it effectively described the force of gravity acting across space between solid bodies. His poetic simile provided a conceptualization of gravity which prevails until the present.

7. In 1907, Pablo Picasso started experimenting with the construction of representational images using abstract shapes, rather than describing the body in the usual organic descriptive terms; his best known early example of such work is Les Demoiselles d' Avignon from 1907. Picasso had observed examples of tribal masks in the ethnographic museum at Trocadero, in Paris and been struck by the intensity of these highly distorted interpretations of the human face. Picasso had been puzzling over how to reinvigorate painting conceptually. The stylized wooden masks gave him an idea for reconsidering the figure in space by focusing on generic aspects of identity, rather than those of specific individuation; it involved the viewer in reflecting on the interpretation and understanding of the image, effectively giving the work meaning.[6] This lead to the development of Cubism and the high level of pictorial abstraction which resulted in non representational innovations in the paintings of Mondrian, Malevich and Kandinsky. Picasso's observation, perceived in the context of his work, allowed him to imagine a new pictorial format which became a cornerstone of twentieth century artistic development and arguably the most significant visual innovation in the last hundred years.

8. The above testify to the role ideas play in research and innovation; in solving the problem. All began with a particular idea, the starting point for a solution which resulted in a major innovation. Solving problems through creative ideas is applicable across the spectrum of knowledge, but for our purposes, the more interesting aspect is how a good idea evolves, how can we develop creative ideas? In the above examples, each idea was the outcome of a consistent pattern of 'observation', 'perception' and 'imagination'; observing the world, perceiving it in the context of a particular problem and imagining an idea which lead to a solution. This pattern runs through every example, all of which have

resulted in significant innovations, flowing directly from the ideas, via testing and application.

9. We are told that the economic wealth of the twenty first century comes from ideas, a post industrial society where prosperity comes not from manufacture, but from a knowledge culture, a domain where ideas are valued beyond the means by which they may be made manifest, the industrial domain which, since Victorian times has been the generator of wealth. But unlike Victorian times where the outcomes of success -property, possessions, capital could be transmitted from one generation to another, creativity cannot be bequeathed and thus perpetuated. Each generation must produce its own creative thought to develop prosperity anew; a 'value added' aspect of production, the VAT (Value Added Tax) of intellectual life. Attention has turned toward the value of the idea, or in general terms, creativity and how it can be maximized within culture.

10. The Italian philosopher Pico della Mirandola wrote in the late fifteenth century: "With the freedom of choice and with honour, as though the maker and moulder of thy self, thou mayst fashion thyself in whatever shape thou shalt prefer"

Mirandola was responding to a new consciousness which the Renaissance had spawned; no longer was the world seen solely in terms of divine revelation, propagated and enforced by clerical authority. There had been the recognition that one could observe and react to one's surroundings, respond to the world as it was experienced and understood and use that understanding to influence one's destiny. There was a sense of individual consciousness emerging, where we could see the world as it was and react accordingly; truth could be observed and responded to, rather than be dictated by authority. It was the stirrings of an analytic approach to knowledge; what Mirandola recognized foreshadowed the Enlightenment, the French Encyclopaedists and ultimately, an empirical methodology based on the analysis of observation and experimentation; he sensed the epistemological basis of contemporary intellectual achievements. In essence, what we see shapes what we do; how we observe the world influences how we respond to it.

11. Louis Pasteur once commented that "Fortune favours the prepared mind" and Lenin remarked that "If you think of revolution, dream of revolution, sleep with revolution for thirty years, you are bound to achieve a revolution someday."[8]
Pasteur and Lenin recognized that our interests, what we are informed about and how we think, determines how we interpret what we see. We observe in relation to our interests and we understand the observations in relation to our knowledge; there is no 'innocent eye', every observation has meaning in regard to how we interpret it and we can only interpret in regard to what we know. Harvey saw in relation to his surgical concerns, Picasso in relation to his artistic focus.

12. There is a story about Albert Einstein during his latter years in the United States when he had become a recognizable and revered personality. A mother interested in her son's well being wrote to Einstein, asking how she could help her child become a great scientist like him. Einstein wrote back 'read him fairy stories'. The mother, puzzled with this reply wrote again, saying that perhaps he had not understood her query and that she

wanted her son to be at the forefront of scientific innovation. Einstein wrote back again suggesting she read her son 'more fairy stories'.

It might seem strange that preparation to achieve in the sciences should rely on fantasies, but Einstein's point is that innovation comes from the imagination, the ability to dream beyond the boundaries of established knowledge and to imagine what might be possible. This view contends that creativity is not discipline specific, but applies across intellectual boundaries, certainly within the creative arts, but also in the humanities and sciences alike and thus imagination is relevant to them all. Support for this perspective is found in research by the Canadian mathematician Jacques Hadamard. Some years ago he conducted a survey of the working methods of major mathematicians in the United States, in an attempt to understand their creative processes. He found that in all but a small number of cases these processes did not depend on analytic thinking as one might expect, but on intuitive types of reactions based on visual, auditory or muscular sensations, which they 'felt' were correct. Reinforcing the role of imagination, Einstein described his working processes as being guided by signs and images and also muscular sensations, which he combined together to develop his ideas.[8]

13. Observation is the starting point for any interaction with the world, be it practical or conceptual, for it is how we relate to what is around us and explore reality. Through perception we comprehend our surroundings, relate sensation to understanding, give it meaning and derive our knowledge of reality. Imagination is the counterbalancing journey through the unreal, the opportunity to chart the seas of fantasy and search for realms, concepts and experiences, unfettered by the limitations of the material world. Together, these provide the parameters of experience, on one side governed by the world around us, on the other fed by the world within; together they give us the substance and process for our ideas and their application, the basis of innovation.

14. At present, the most difficult problems facing humanity relate to social and cultural issues, social instability, poverty, environmental degradation and insecurity. All impact on individual wellbeing, resulting in personal suffering, but their greatest effect is on society as a whole. Perhaps the greatest single threat facing contemporary culture results from the terror which results from acts of aggression against civilian populations. In the post 9/11 period, terrorism has entered the consciousness and conversation of governments and civilians around the globe; it is a daily item on news broadcasts, a perceived source of distress and instability and a once remote phenomenon which now impacts on the lives, travel and livelihood of millions. What has become apparent is that despite the discussion, debate, blame and vast expenditure, we have not found affective mechanisms for combating terrorism. We have tightened boarder control, enacted new legislation, boosted intelligence gathering, and built our defense services, but with limited success. This paper proposes that the mechanism for addressing any social problems, no less 'the war against terror' should be approached systematically, as are the problems discussed above. We should observe its only too obvious forms, perceive the reasons why it exists and most importantly of all, imagine how it can be solved.

The standard approaches to maintaining security need augmenting by more lateral approaches. It is suggested that addressing security problems through more creative mechanisms is crucial, if we are to combat the impact of terrorism; to see it not as a single entity, but as an aggregation of individual concerns, which result in related attitudes and acts of aggression. Identifying the issues which result in acts of terror enables us to consider the underlying problems, reduce them to their constituent parts and address concerns which might otherwise lead to acts of violence, instead of reacting to the horror of the results. It equips us to observe the issues, perceive their meaning in the context in which they are problematic and imagine possible solutions. In this way we address the details of how to maintain a secure world and not merely acknowledge the generalities of the need to do so. It is proposed that the best way to consider security on both national and global scales is through a think tank approach, with relevant parties exploring the issues and looking for 'creative ideas' to provide solutions.

We all have the ability to observe, we all have the ability to perceive, to think about what we observe and acquire knowledge as a result. I suggest that we also have the ability to imagine, to allow our dreams to inspire our actions and wherever we apply our knowledge to do so through innovation, to create a world that is more beautiful culturally, more cared for environmentally, more equitable socially and more secure personally, be it as artist, scientist, economist or as a professional in any discipline. It is through this that our personal potential may be realized, our passion expressed and used to drive the innovation which nourishes society and on which culture depends.

Considering difficult social or cultural situations as problems, parallel to those in an academic domain, allows us the opportunity to develop alternate solutions to address the circumstances, not merely respond with the most obvious, or the easiest path of action; it allows us to explore the potential each situation provides in terms of growth and development. It could be seen as the antithesis of the 'knee-jerk' reaction; it invites us to put effort into our human interaction and find mechanisms to work with others rather in competition or conflict with them. If we approach difficult circumstances with a view to being innovative, we have already decided to make the effort to find a constructive solution and apply the creative abilities observation, perception and imagination place at our disposal. Innovation is the test of our ability to react with thought, to look for the positive and eschew the negative in our approach to a peaceful, secure and equitable world.

In resolving problems which can result in conflict, it is important to consider a fundamental characteristic of what makes us human. What separates us from the animals is our ability to discriminate, to choose between the options before us and direct our actions where we decide they may be most effective; we can act in ways other than what is dictated by instinct. There may be circumstances when violence is called for, but when we chose the path of violence, we use that which we share with all living creatures, the instinct toward aggression. Alternately, when we choose to find a solution which eschews violence and steps aside from the aggressive option, we are utilizing an ability which defines our human identity, our sense of discrimination and choice; it is an option which reinforces our humanity.

Notes

1. Da Vinci, Leonardo, Codex on the Flight of Birds, in Leonardo Da Vinci, Reynal and Co. NY.
2. Mc Farland, M. W. (ed), The Wright Brothers' Papers, 1953.
3. Hoffert, B. The End Justifies the Means, Speculation and Innovation Conference, QUT, 2005.
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5. Koestler, Arthur, ibid.
6. Hoffert, B. J. et al, Art in Diversity:Studies in the History of Art, Longman,1995, p. 110.
7. Hoffert, B. The End Justifies the Means, Speculation and Innovation Conference, QUT, 2005
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