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CREATIVITY - OPENING PATHWAYS TO THE HIDDEN POWER OF CREATIVE PRACTICE

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ABSTRACT
Creativity is a complex multifaceted human ability which despite much investigation remains elusive. It involves all the senses and motor functions as well as the subconscious and conscious domains of the brain. This paper does not attempt to approach the subject from a psychological or neuro scientific viewpoint but from the experience of creative practice. The established and proven techniques within creative practice are seen as offering general potential for opening pathways into the subconscious and intuitive mind which can deliver enhanced creative performance.

Keywords: Creativity, subconscious, intuitive, practice, incubation, sleep, visual thinking, music, creativity tools

1 INTRODUCTION

Much has been written about creativity but despite all the interest in this subject, creativity remains one of the least understood areas of research. Compared to research generated knowledge in almost every field, we know relatively very little about the subconscious mind and how creative processes work in the brain. Through the advances in MRI scanning, we now have a better view of how the brain distributes its workload, yet insights which make it easier to access latent creativity remain elusive. This paper sets out to explore potential contributions to the understanding of creativity from creative practise. Is it possible to open pathways to creativity through an increased awareness and application of successful practise? The paper is based substantially on the authors' own practise in industry [1] and education, as well as the practise of other practitioners and PDE Students [2].

2 HISTORIC PERSPECTIVE

Mankind's ability to make tools and solve problems (strongly implying a creative element) is said to set us aside from animals. Creativity in some form has therefore been with us throughout our existence and evolved along with our other mental faculties.
Some of the most important milestones in our understanding of creativity are:

- Archimedes — EUREKA moment, incubation and subconscious
- Leonardo — Visualising and annotation, maps and diagrams
- James Nasmyth — The mind's eye
- Alex Osborn — Brainstorming and Osborn's list
- Anthony Buzan — Mind mapping and radial thinking
- Edward deBono — Lateral thinking
- Crick and Koch — Understanding the subconscious mind and the Zombie within

The authors believe that a deeper understanding of the subconscious and intuitive creativity is an essential strategy for improving the education and success of our young people and particularly Designers and Engineers. Mankind has created the world we live in with all its triumphs, failures and associated problems. Are we smart enough to solve these problems in time? This is a global and multidisciplinary issue which affects us all. To improve life for all, solve our problems and ultimately secure our survival, we need to utilise everyone's creative potential far more effectively. The Royal Society of Art's 5 Manifesto Challenges and the many resulting projects are very good examples of positive global action in this respect.

3 SUBCONSCIOUS POTENTIAL

Francis Crick (scientist and Nobel Laureate who discovered the structure of DNA) and his research partner Christof Koch have said that the subconscious mind is the major unsolved problem of science. They talk about the zombie within and highlight the fact that the subconscious mind is constantly active in everything we do; walking, talking, cycling, driving etc are all performed through subconscious and conscious computing and control, with the conscious and subconscious mind working together. In creative processes this collaborative activity between the conscious and subconscious is important, however conscious deductive logic may be so dominant that it switches off the subconscious intuitive creative processes, rather in the same way as a powerful radio transmitter cancels out a weaker one. The reasons for this dominance may be part conditioning and education and part innate, a programming or hardwiring effect in the brain, possibly evolved as a survival reflex. Whatever the cause, the effect is to make it difficult to be creative; access to latent creativity may be intermittent and elusive. Therefore we need to develop strategies and tactical actions which effectively switch this dominance off, distract the logic deductive processes in favour of intuitive creative processes. In terms of the radio transmitter analogy, it would mean to match the strength of both transmitters. This indicates an opportunity for creative practise to make a strong contribution towards understanding creativity, yet this area is substantially under researched. The effect of *verbal overshadowing* may also be a contributing factor in blocking creativity. The act of putting an idea into words could distort the idea to the extent where important aspects of the creative idea are overshadowed and lost by the brains verbal generating process. Visual recording of ideas as they occur followed by subsequent annotation may avoid this.

The brain is capable of a staggering number of networks with a connectivity level of extremely high power. It has been estimated that the adult human brain has 100 million neurons, with a total number of synapses estimated at 100-500 trillion, while a 3 year old has 1000 trillion synapses. This is an enormous and complex structure. Leibniz's famous model of the mind as an iceberg with the conscious mind represented by the tip and the subconscious mind as the much larger and unseen underwater portion of the berg is a powerful allegory of the potential latent capacity which remains unused. Our current utilisation of creative potential is a bit like running a 4bit calculator program on a dual processor computer capable of 3D visualisation in real time with photorealistic rendering to cinematographic standards. It works, but uses only a small fraction of the available capacity, just like the human brain.

4 ELUSIVE NATURE OF CREATIVITY, THE DAPHNE DILEMMA

The more creativity is pursued with logic deductive thinking, the less likely it is to generate understanding and insight into creativity; this is the Daphne dilemma; the sun

god Apollo pursues Daphne, the morning dew, but his heat evaporates her and he can never capture her. The eminent artist and Professor of Conceptual Art Cornelia Parker has expressed some of the most critical aspects of creativity in a very descriptive and succinct statement: *Inspiration is a slippery thing. You have to keep it in peripheral vision, pretending not to be interested, because when you are consciously looking for it, it remains infuriatingly elusive. I am usually walking, on the bus, mid-conversation or in bed when it happens. Often the most inspiring situations are when you are forced outside your comfort zone and made to challenge your perceptions and prejudices. By trying to bridge the gap between your sense of reality and the one you are confronted with, rarely used parts of your brain suddenly become activated. Then like a microscopic jigsaw puzzle, tiny points of stimulus accumulated over time come together in an instant, making you think you have had an idea that came from nowhere'*. [3] This is a clear and elegant insight into the elusive character of creativity as well as the importance of incubation and the generation of new neural networks.

5 CREATIVE PRACTICE

The act of practise in itself can be a powerful inspiration and offer creative flow. The coordination of eyes, hands and brain, in fact all the senses are intuitive and substantially subconscious. Thus by practising the making aspects of design, working with materials and technology, a substantial pathway to the subconscious is opened and it should therefore not be a surprise that creative ideas often come through practise. Sadly the making or craft aspects of design have lost position in education over recent years, this could turn out to be a big mistake. We clearly see the benefits gained by students who start 3D work early on in their design process versus the negative impact on students who leave this to later on.

5.1 INCUBATION

Incubation time is an important aspect of creativity. The subconscious mind sometimes works slowly and as indicated by Cornelia Parker, it is a process which takes place 'over time'. We have observed that if the mind is 'programmed' with specific information such as physical dimensions, material characteristics, process parameters etc as well as a problem definition, then left for a while; often a creative solution will flow in time. This pathway has been observed to succeed consistently and is greatly facilitated by visualising the problem, writing it down perhaps as a list and the solution harvested through revisiting the problem mentally whilst doing a task which involves subconscious activity such as driving. A greater recognition of this incubation could open for much better access to creativity, however today's businesses and institutions operate in ways which block this pathway by enforcing rigid linear work patterns with accountability for decisions and not allowing for subconscious activities during work time. Certainly heavy workloads and difficulties experienced by individuals at work are effective creativity blocks. As companies have difficulties in coping with creative processes, some of the most important inventions have happened in skunkworks, where creative people have been able to practise creativity outwith the rigid environments of the company.

5.2 ROUTINE

Belgian colleague Igor Byttebier has stated: '*If you always do what you have always done, then you will always get what you have always got'*. This is an astute observation which may be regarded as obvious, nevertheless it needs to be stated and often as

routine bound working conditions effectively shuts out creativity. The creative freedom of breaking routine and thinking out of the box is essential.

5.3 LOAFING

The eminent psychologist Guy Claxton has a tip and suggests that we should all 'learn to loaf': *'Learning the art of loafing is absolutely essential for creativity, productivity and peace of mind. It is vital to spend time every day dozing, doodling and goofing off. You should never ignore feeling sleepy: it is literally dangerous habitually to keep on going when your body is telling you to rest. The faster the pace of life, the more you need to make time to meander, drift and do things that have no point or product. Find your equivalent form of inactivity, cherish it, and give yourself to it as regularly as you can.'*[4]

5.4 SLEEP

Sleep, near sleep and dreaming; the hypnagogic state, can open a very powerful pathway to creativity which has been substantially observed in practitioners:

Thomas Edison understood this and used a technique which allowed him to harvest many creative ideas. He often took a catnap in a chair whilst holding ball bearings in his hand. As he drifted off to sleep his hands would relax and the noise of the ball bearings falling on the floor would wake him. He immediately recorded the ideas his subconscious mind had generated whilst drifting off to sleep and many of these were developed into commercial innovations.

Salvador Dali practised a similar technique by resting on a sofa whilst holding a spoon in his hand balanced on the edge of a glass. The clatter of the spoon as his grip loosened when he drifted off to sleep would wake him with fresh inspirational images in his mind, ready for capture by his brush on canvas.

Otto Loevy, the cell biologist and Nobel laureate once woke from a dream with a powerful insight into his current work problem. He wrote the ideas down in the dark, however the next morning he could not read his own writing! The next night he again woke with the same insight and this time he got dressed and went to his lab and tested out the idea. This was the beginning of a process which eventually resulted in his Nobel Prize.

Paul McCartney says that his top hit 'Yesterday' was generated in a dream and he woke with the lyrics and the tune which he wrote down. Mozart is also recorded as having created several of his famous pieces this way.

Kekule discovered the ring structure of the Benzene molecule in a dream where he visualised snakes representing linear chemical structures and when one snake seized its own tail Kekule realised that the structure of Benzene could be circular instead of linear.

Children who in general are very creative have an abundance of slow theta brain waves (4-8Hz), whereas adults tend to have theta waves specifically in the hypnagogic state. Is this the key to the enhanced creativity in near sleep states?

5.5 PHYSICAL EXERCISE

The brain weighs about 1.5 kg and uses 20% of the body's oxygen supply. Moderate exercise such as walking swimming and cycling substantially enriches the oxygen supply to the brain and is therefore very beneficial to mental processes. The rhythmic use of muscles may also have the effect of defocusing logic deductive thinking and therefore help towards opening pathways. This detachment or dissociate state can be learned through exercise and when established can then be transferred to a work situation. Endorphins produced during exercise may also play an active part in enhancing the creative process.

5.6 VISUAL THINKING - THE MIND'S EYE

The practise of visualising creative thought is very beneficial to the process. Visualisation achieves two things; it records the thinking as it takes place and it communicates the thinking process to its originator and others. This is of great importance in design education, where the learning process is enhanced by visual communication between individuals, students and tutors.

James Nasmyth's 'scheme book' or folio is a rich exemplar of excellent practice in visualisation and annotation, allowing us in depth access to his creative processes. In his biography he has also described his creative process in some detail, most worthy of quoting: '*I had long contemplated this application (pile driving) of the power of the steam hammer. The machine had long been in full action in my "mind's eye"……...I have said that the steam pile driver was in my mind's eye long before I saw it in action. It is one of the most delightful results of the possession of the constructive faculty, that one can build up in the mind mechanical structures and set them to work in imagination, and observe beforehand the various details performing their respective functions, as if they were in absolute material form and action. Unless this happy state exists ab initio in the brain of the mechanical engineer, he will have a hard and disappointing life before him. It is the early cultivation of the imagination which gives the right flexibility to the thinking faculties. Thus business, commerce and mechanics are all the better for a little healthy imagination'*. [5] Nasmyth's insight is extremely valuable and we can still learn much from it, both in practise and in education. Visualising creative processes is both a matter of using the mind's eye and committing the visualisations to paper or other medium so that it can be communicated.

5.7 MINDMAPPING

Of all the tools for engendering clarity and structure in thinking processes, mind mapping is probably the most powerful, possibly as its organic networks mimic neural networks in the brain. Buzan's contribution in evolving his concepts of mind mapping and radiant thinking are of enormous value and potential. This is further extended by software such as 'Inspiration' which allows rapid thinking processes to be recorded in mind map format and easily edited.

5.8 MUSIC

Music can powerfully induce joyful states of mind which tend to inhibit the logic deductive processes and through this to open pathways to creativity. Clearly individual taste in music comes into play, but with the current portable playback technology readily available this need not inhibit its application. As well as stimulating the auditory sense music is also seen as a 'visualising' experience and as being '3Dimensional' which may help to stimulate a creative mental state.

5.9 HUMOUR

Comedy is full of rapid fire, unexpected turns and wayward antics, closely related to creative thinking. This resemblance puts the mind in a good frame for creative processes. The laughing response strongly reinforces this.

5.10 BIOMEMETICS

Inspiration from nature can open major pathways for creativity and is looking promising for future potential. As a relatively new branch of science, biomemetics is now a major emergent technology, but people have utilised nature's inspiration for a long time. The

inspiration for Velcro came to a Swiss textile engineer when he discovered barbed seedpods sticking to his dog's fur.

5.11 ENVIRONMENT

What is a creative environment? Experience from an Incubator Park in North Tyneside has shown that when thinking space is designed into the working environment, it can have very positive benefits for the organisations involved [6]. The mind is influenced by the nature and quality of the surroundings and iconic buildings such as the Mackintosh Building at Glasgow School of Art can have major positive benefits for creative processes. Conversely poor environments have the opposite effect. But there is more to the environment than just the building; Individual customisation and ownership as well as team dynamics and availability of appropriate tools also influence creativity.

5.12 CREATIVITY TOOLS

Osborn's Brainstorming and 'creative problem solving process' is perhaps one of the most powerful tools for creative thinking; provided it is carried out as intended it produces very good results.

Edward de Bono's lateral thinking, although a verbal as opposed to a visual tool works very well, possibly because it distracts and sidetracks logic deductive thinking by breaking up sequences and forcing new and novel connections.

6 APPLICATIONS AND CONCLUSION

Because the human minds are all individual and different, it is difficult to provide absolute recommendations for accessing creativity. However individuals should be able to consider all the categories discussed and adapt the approaches to suit their individual requirements. Much more research needs to be done into creativity from the creative practitioners stance and it would be valuable and interesting to see a response from those who practise creativity in their professions and anyone who can offer insights into this elusive yet powerful part of our mental ability. We also have to give credit to our students and the creative measures that they apply in the studios. The students of PDE have introduced creative tools to the studio practice that have been beneficial to all years that have been involved. There is a positive and inspirational sense with the students that 'anything is possible' in the studio learning environment.

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