TRANSCENDENT DEVICES:
AN EXPLORATION OF THE MECHANICS OF
CREATIVE DECISION MAKING

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ABSTRACT: This research investigates the initiations, limitations and outcomes of the creative process with particular focus upon sonic art forms. Where does the artist begin and at what point is it determined that the creative artefact is complete? The work will discuss the conditions, characteristics and constraints of creative work; whether the work in question is an original musical composition or the favourable individualistic arrangement of given sonic material. Are there benefits in considering constraints to steer the stylistic trajectory and maintain consistency or could this be regarded as expressively inhibiting? Could structural consideration at the outset provide a creatively liberating framework ensuring authenticity and coherence through analogous models? or could this engender feelings of inhibition curtailing imaginative excursions? The result of this structural approach may be regarded as a lack of progressiveness that for some may prove to be an initial, however illusory, motivational feature. Both authors will offer perspectives from distinctive but related creative disciplines from geographically displaced UK universities. This current study builds upon a portfolio of developing insights into creativity to discuss approaches and attitudes to the creative process within commercial musical composition and recording studio post-production processes, to address the two fundamental concerns of: how to begin a creative process, project-manage and when to determine that the process is complete.

> *"To finish a work? To finish a picture? What nonsense! To finish it*
> *means to be through with it, to kill it, to rid it of its soul, to*
> *give it its final blow... the coup de grace for the painter*
> *as well as for the picture."*
> *-- Pablo Picasso (1881-1973)*
> *-- Quoted in Jaime Sabartes, Picasso: portraits et souvenirs, ch. 7 (1946)*

INTRODUCTION

The focus of this paper is upon creativity within the arts with particular emphasis upon music. The primary objective is to offer insights and to develop procedural strategies for application predominantly, although not necessarily exclusively, within higher-educational environments. The working practices of professional and educational creators will be considered to derive a series of conceptual and practical *tools* that may serve to facilitate a satisfactory and productive creative experience. Two fundamental scenarios will be considered throughout the paper; the first will be the creation of new ideas investigating creative motivation, constraint, development and outcome. The second will consider the process of post-production within which pre-existing recorded materials are subject to creative arrangement, re-arrangement and processing. In both cases, there are a multitude of potential outcomes with significant space to assert individual identity; fundamentally the product commercially will likely be the result of combined creative effort from inception of idea to final distribution artefact. Drawing upon insights gained from creative colleagues and undergraduate teaching, the work will consider to what extent pre-considerations and expectations are factors in determining creative trajectory. The study will consider five primary attributes that will form the basis of the discussion:

- Education
- Definitions
- Creative Domain
- Creative Theory
- Creative Strategies

GENESIS

Why would one be drawn to contemplate a creative act? There are a number of reasons that may be considered (see Figure 1), such as artistic need, desire or compulsion to communicate non-verbally; it may be for purely financial gain, an imminent assignment or perhaps there is an identified problem that requires a particularly individual solution; whatever the reason, without motivation there would be no creativity. Educationally all of the students encountered upon the author's programmes have already demonstrated a creative facility in the form of a portfolio of work:
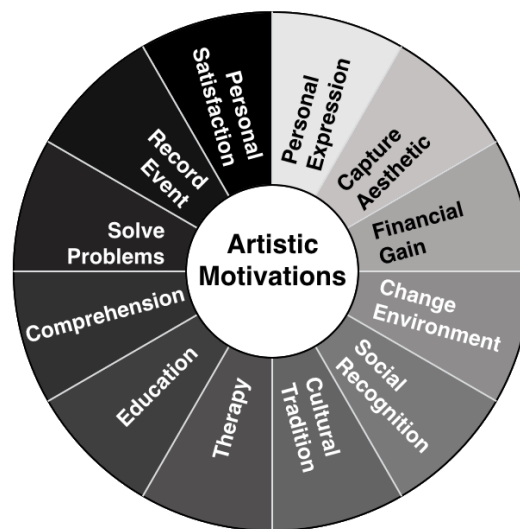

Figure 1 - Creative Motivations

To what extent does understanding the nature of creativity benefit the creative process? This question is at the heart of this paper. When all is well and the creative ideas are *flowing* then there may be little need for such introspection; perhaps there is even a reluctance for looking too closely at a fully functioning intuitive process for fear of derailing the productivity and tainting the *magic*, since the feeling of inspiration, of which artists often speak with reverence, can be perceived to be an *external* rather than *internal* mechanism; in times past the sense of a *Muse* bestowing creative wisdom was an alluring notion elevating the artist into a privileged position whilst at the same time relieving him/her of creative responsibility. Understanding creativity, through reviewing significant artefacts or interrogating successful artists may very well offer significant insights into the conditions within which novel ideas arise, but can creativity be taught or at the very least enhanced? Creative subjects are invariably taught without any reference to creativity as an independent discipline. Students of music may be taught practical instrumental skills, developing performance repertoire, musical analysis engaging in exercises in harmony, counterpoint, arrangement, orchestration and various re-creative assignments, but the composer's creative strategies and the development of individual artistic expression (see Figure 2) are very often not directly addressed, particularly early on in the educational process. The development of a *sense-of-aesthetic* is to some extent left to chance and personal style tends to develop out of repetitive habits and discovery.
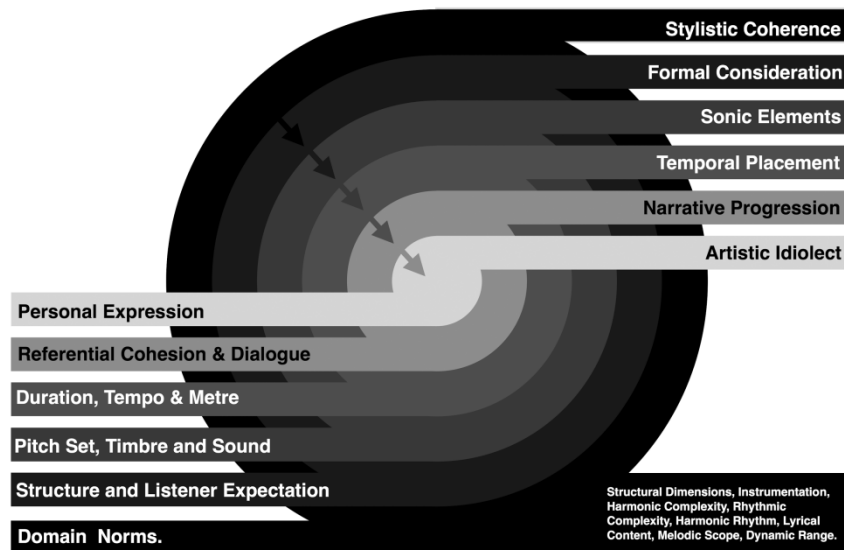
Figure 2 - Traditional Compositional Characteristics labels:

Stylistic Coherence
Formal Consideration
Sonic Elements
Temporal Placement
Narrative Progression
Artistic Idiolect

Personal Expression
Referential Cohesion & Dialogue
Duration, Tempo & Metre
Pitch Set, Timbre and Sound
Structure and Listener Expectation
Domain Norms.

Structural Dimensions, Instrumentation, Harmonic Complexity, Rhythmic Complexity, Harmonic Rhythm, Lyrical Content, Melodic Scope, Dynamic Range.

Figure 2 - Traditional Compositional Characteristics

Successful commercial music is not exclusively dependent upon the composer or performer abilities to produce new and marketable work; typically, it is a team of skilled musicians, producers, engineers and technicians who collaborate together to craft and refine the product. In general, artists need producers to help them realise a creative project; they tend to be much more experienced in the industry and are able to assist the artist in avoiding problems, maintaining their focus within a given timeframe. They understand the potential fragility and vulnerability of the creative performer, and are very much an integral part of the creative process often making suggestions and and shaping creative outcomes. This culture of creative teamwork began in the music industry as far back as *Tin Pan Alley* with its songwriters and publishers and is manifested within the design and use of early recording studios such as *Abbey Road* in the 1930's, which was one of the first purposely built commercial recording studio that employed teams of producers, songwriters and technicians. The commercial creative process evolves through four stages that conceivably may overlap: 1. *Pre-composition* - may involve stylistic consideration or even calculations, 2. *Composition* - may be internalised idea or partially developed/improvised upon an instrument/s, 3. *Realisation* - The ideas are developed upon instruments, real or virtual, into a fully formed structure that is recorded, and 4. *Post-Production* - the performances are balanced, tuned, mixed and prepared for distribution. The hierarchical nature of the early *Abbey Road* recordings which generally involved songwriters creating the songs, producers guiding the performers and engineers operating the equipment, began to change in the 1960's as the recording equipment and mixing desks began to be used more creatively, sometimes as a result of fortuitous serendipitous behaviour. Much of the innovating popular music produced in the 1960's was the product of experimentation utilising tape-loops and effects processing, informed by the avant-garde experimental classical traditions. During this time, the delineation of roles between producer, musician and technician became less clear; these roles are, to some extent, now interchangeable particularly with the advent of affordable home studio facilities and computer generated instruments: Collaboration within commercial music production is still a significant feature feeding and maintaining the creative workflow. Sawyer and DeZutter (2009) outline the importance of group creativity research, *"a wide range of empirical studies has revealed that significant creations are almost always the result of complex collaborations";* whereas the *significance* culturally, or otherwise, of commercial musical production might be debatable, the mechanisms of distributed creative practices are certainly worthy of investigation. Students of sound engineering, faced with creatively mixing multiple sound-files, may be taught (see Figure 3) the physics of sound, the mechanics sound editing/processing along with critical listening skills to allow the development of consistent perception and appropriate sound treatments.
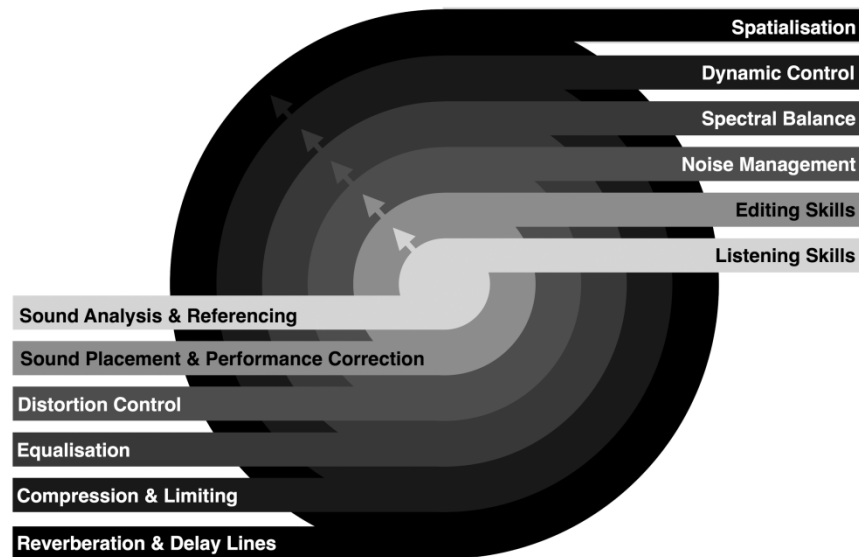
Figure 3 - Post-Production Characteristics

Common stylistic characteristics are absorbed through comparative studies of musical constructs and imitative exercises conforming to norms of behavioural expectation. A common activity would be the re-creation of classical recordings to determine the ideal behaviours and learn the available tools. In assessment, it is often easier to identify the errors in application, uncharacteristic deviations from the normal, rather than determine and validate individual musical expressions that may be an indication of a particularly unique interpretation.

MISSING IN ACTION

Definitions can initially seem obvious but sometimes provide new insights and perspectives into creative activities and stimulate creative potential; a definition, well expressed, can sometimes facilitate a realisation of what is achievable; this is where this study will begin and indeed where the authors both begin their respective classes in creative study to determine what is captured and what is missing from such definitions. What is Music? Music is inherently a multi-sensory experience; we *hear* in space, we may *see* or associate in our imagination a causal source, we may *feel* objective resonance and create internal narratives to support emotional constructs, guided by performer gestures and extra-musical associations. Given this, how should music be defined and what would be the benefit of such a definition? Perhaps to offer illuminating insight and provide meaningful constraints for creative focus? A typical dictionary definition offers: *"the science or art of ordering tones or sounds in succession, in combination, and in temporal relationships to produce a composition having unity and continuity"* (*Merriam-Webster's Collegiate Dictionary*, online edition), which presents the obvious dominant characteristic and compositional preoccupation as naturally *sound*; regular patterns in which ideally result in listener coherence and sustained interest. In a conventional sense, we might reasonably define music, in terms of this sonic attribute alone, as simply *'organised sound'*; the definition although seemingly superficial is satisfying since it is open and all-embracing of musical space, as was intended when Edgard Varése similarly expressed it (Goldman 1961, 133) when discussing his own aesthetic sensibilities in relation to his recent excursion into multi-speaker tape composition: Poème électronique (1957-58). What is composition? A sonorous and temporal creative act, idea, performance or recording that might be considered new and valuable. To achieve value, this could involve be a transformation in an existing stylistic domain or the establishment of a new one that achieves cultural recognition. Alternative organisational designs in music we will call *style*, to mean the accepted *norms* of a musical period or individual. *Style* then in music refers to the common attributes and behaviours within a musical form; in any given *style*, certain features are considered normal and others anomalous. All sound may be considered *musical*, which is the virtue of the above definition, but in each culture musicians tend to admit only a subset of acceptable sounds, frequency arrangements, combinations and temporal patterns, into sonic expression. There may be no single

intercultural definition of music and the boundary between musical sounds and noise may be culturally blurred. Varése speculated (Goldman, 1961) upon the future of music *"the score of the future would need to be seismographic in order to illustrate their full potential"*, citing the definition of music given by Józef Maria Hoene-Wroński: "the corporealization of the intelligence that is in sound", as being particularly influential in shaping his musical imagination. Music could dispassionately be regarded as an abstract sonic temporal construction, constrained by pre-formed elements organised in predefined relationships; a product perhaps more of *discovery* than invention, that might conceivably be determined or computed. Permutations and combinations of acceptable outcomes might be calculated and selected according to stochastic design (see Figure 4). From this perspective, mechanised musical culturally verified artefacts might be fabricated or synthesised according to audience requirements for expectation, consistency, coherence and originality.
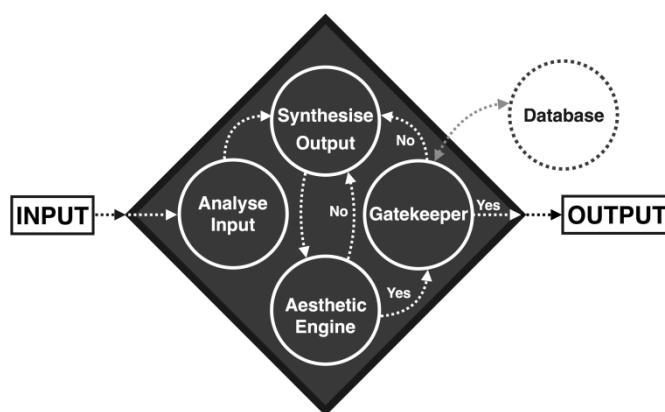

Figure 4 - Music Logic Machine

Educationally it is not uncommon to study the *craft* of composition by learning the characteristics of archetypal work, through systematic analysis codifying behaviours tested through re-creation; creative motivation and method is somewhat less often addressed and there are other important peripheral attributes of musical expression and experience *missing* from the analysis, that may offer new perspectives and valuable insights such as:

- The creative process: which is very likely non-linear; does music have to be experienced along a fixed timeline?

- The communication and expression of emotive design through dynamic physiological gestures in performance; music has at times been considered a language with linguistic syntactical structure (see Bernstein, 1990). The imprecision within the symbolic representation (notation) is also profitable for performers, allowing for expressive individual interpretation.

- The tactile sensations of performing/composing upon instrument, sensing and responding to the resonant vibrations within a space. Each performer has individual muscle memories and patterns of behaviour that may be meaningfully codified outside of sound.

If we could transform and translate our perspectives, music might be qualified in other ways; Varése experienced such an epiphany (expressed in the Lewiston Daily Sun, 1936) when listening to a Beethoven symphony: *"I became conscious of an entirely new effect produced by this familiar music. I seemed to feel the music detaching itself and projecting itself in space. I became conscious of a third dimension in the music"*.

NOVELTY AND COHERENCE

In order to be creative, it is clearly important to understand to creative domain within which creativity is to take place. Given the self-imposed limitations, music remains a system of sufficient complexity to allow for

combinatory and sequential variation accommodating novelty, identity and meaning. According to Csikszentmihalyi (1996), a creative artefact requires a context within which it is created and reviewed (see Figure 5). The artist learns the *rules* of the creative domain, ensuring audience coherence, and then arranges the elements in new ways maintaining artistic consistency. The completed artefact is then offered to the *gatekeepers* to verify its validity and uniqueness to be added to the domain database. Innovation in music however, requires more than mere *novelty*; the newness must have a context for it to be validated by the domain gatekeepers, as Frank Zappa said (Zappa, 1989): "Without deviation (from the norm), 'progress' is not possible…In order for one to *deviate successfully*, one has to have at least a passing acquaintance with whatever *norm* one expects to deviate from".

Does understanding the creative process make creativity more or less likely? If it can be accepted that creativity is indeed a process, a way of operating, then it is conceivable that it can be learned or enhanced as a skill. As a fundamental component of undergraduate studies within creative subjects the authors have integrated sessions upon *creativity* as a particular discipline into all levels of creative academic engagement; the objective is to introduce the notion that attending to creative thought processes could be profitable in seeking a solution to a presented problem, which is frequently defined as an assignment brief in the form of a commercial commission. A common assignment brief would be to compose or post-produce music according to given stylistic constraints to satisfy a particular function.
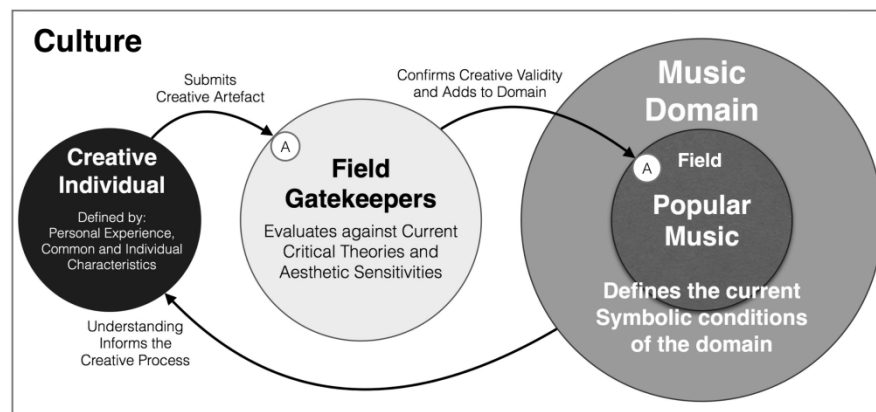

Figure 5 - The Creative Domain, adapted from Csikszentmihalyi (1996)

Many of students frequently encountered have already demonstrated a capacity for producing creative work on some level, so a part of the study is to identify creative traits and behaviours that may already form a part of their individual identities (see Figure 6). Behaviours that are regarded as profitable may also be adopted those that are not can perhaps be reduced. The challenge is to express the creative process in a directly applicable form or translate prevalent theories in ways that are meaningfully applicable. What is actually meant by creativity in this context? From a compositional perspective, the objective is to produce new music; for post-production the outcome should be a unique mix of sounds; both products however are required to be functional. Newness and uniqueness are not objectives to be pursued in preference to coherence. Absolute novelty as a creative objective is not to be considered a beneficial trait in an environment in which listener comprehensibility is paramount.
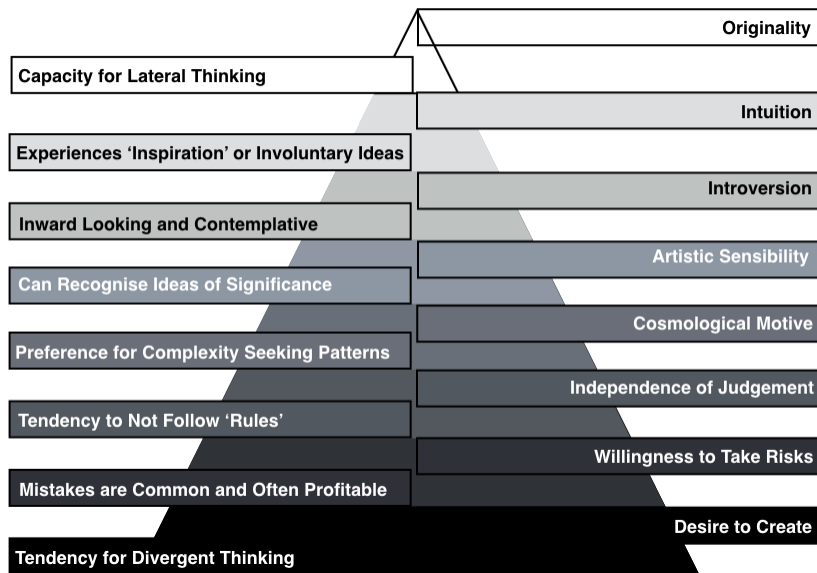
Figure 6 - Creative Characteristics, adapted from Barron (1969) and Guildford (1988)

Performer identity and self-expression are only meaningful if the artist has consistent, repeatable, traits that are different enough from other artists to be desirable but similar enough to be familiar. These behaviours can prosper in systems that have sufficient complexity to allow multiple solutions but with enough syntactical structure to allow coherence. How does the artist know that something original with value has been produced that also satisfies the need for comprehensibility? Fundamentally coherence is determined through comparisons with other like products; this may receive a validation of authenticity from an audience or a search approval from a database, which could be any thorough searchable, via audible sonic comparison or numeric analysis, collection of historical musical achievements. In the case of composition this is particularly relevant to be certain that there are no copyright infringements. Composition and the post-production process involve to a large extent the selection and arrangement of known elements in acceptable ways; what is *acceptable* is largely governed by convention and experience. What is also sought as a part of the process is the accommodation of significant but *attractive* differences in interpretation representing the identity of the creative individual. An original idea needs then to satisfy the requirements of the stylistic domain (see Figure 7), appeal to the listeners and pass the scrutiny of the gatekeepers. Expert creators have a tendency for overly complex solutions, that make use of years of experience and knowledge, which can sometimes inhibit creativity, often overlooking the simpler solutions that might be more accessible to the novice creator. A common strategy for the *expert creator* is to induce a naiver perspective of the domain through the use of self-imposed constraints as expressed by Stravinsky (1942) *"… my freedom will be so much the greater and more meaningful the more narrowly I limit my field of action and the more I surround myself with obstacles…. The more constraints one imposes, the more one frees one's self of the chains that shackle the spirit."*

A perennial anxiety is where to begin? Assuming *inspiration* (however this is defined) is not forthcoming and the outcome of the creative act is governed by particular imperatives, as is common within education or the commercial world, how is the creative process invoked and maintained? Even with ordinarily self-assured individuals there may be periods of creative block where there is a sense of expressive paralysis because the projection of imagined *perfection*. This experience is particularly resonant for students about to embark upon a significant piece of assessment that will ultimately be subject to a critical review. If the outcome has assumed an exaggerated importance in the mind of the potential creator then fear of doing the wrong thing and attracting a negative response, or fostering a focus upon an idealised outcome or even an idealised response to an imagined outcome before the first step has been made can prove ultimately inhibiting; as American composer Aaron Copland (1959) expressed it as follows: "There is the fear of being wrong, plus the insecurity of not being able to prove that

one is right, even to oneself". How might one circumnavigate the experience of creative block? Frank Zappa (1989) was typically dismissive of qualitative responsibility when offering advice for prospective composers:

> *Just Follow These Simple Instructions:*
> 1.   *Declare your **intention** to create a "composition."*
> 2.   ***Start** a piece at **some time**.*
> 3.   *Cause **something to happen over a period of time** (it doesn't matter what happens in your "time hole" – we have critics to tell us whether it is any good or not, so we won't worry about that part).*
> 4.   ***End the piece at some time** (or keep it going, telling the audience it is a "work in progress").*
> 5.   *Get a part-time job so you can continue to do stuff like this.*

CREATIVE THEORIES
An integral component of music classes are incorporated sessions on creative thinking. Classic domain-general models of the creative process such as by Wallas (1926), Koestler (1964), Guilford (1967), Baron (1969) and Sternberg (1999) are discussed to raise awareness of potential common creative mechanisms and a consideration as to how this knowledge might be applicable in specific disciplines.
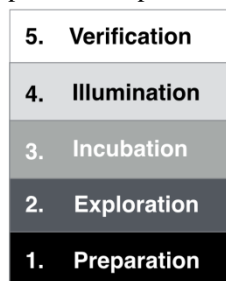

Figure 7 - A Creative Process, adapted from Wallas (1926) and Young (1965)

The fundamental objective in this undertaking is to offer meaningful and applicable insights into the creative process and consequently encourage the student to take greater control over their personal creative activities. It is not difficult to imagine how one might apply the above model (see Figure 7) to music production. 1. *Preparation* - Listen to music stylistically focussed and widely diverse; also read widely and take notes, 2. *Exploration* - consider how the various music, ideas might be related, 3. *Incubation* - Do something unconnected and try not to focus upon work, 4. *Illumination* - record the ideas and 5. *Verification* - review and evaluate ideas. What is difficult is to guarantee a result or to predict a realisable timeline for the advent of the *illumination* stage

The extent to which *domain-general* theories can have a meaningful impact upon the productivity and successes of a specific set of creatives is debatable (Baer, 2012) but nevertheless, the sessions are generally very well received and do promote very positive discussions of productive attitudes and practices although, tests of creative potential (Kim, 2006) rarely yield any meaningful insights into the creative musical potential. A common initial conception that arises out of student discourse is that creative states of mind are inaccessible without some form of inspirational intervention and as such the study of creativity may not be directly beneficial; this perspective for some results in potentially redundant timetabled laboratory sessions within which the creative artefacts that are requested are not immediately forthcoming. This is compounded by the observation that much research into creativity is often preoccupied with the study of examples that transcend the boundaries of the domain, whereas musicians generally wish to refine a creative identity which depends to a large extent upon repetition of behaviours. It is interesting to note that when students are invited to share personal work that is regarded as fundamentally a result of inspiration, no examples offered have ever been realised without a stylistic context. All work was stylistically framed by experiential conditions within a familiar domain. As observed by David Byrne (2012) *"I*

had an extremely slow-dawning insight about creation. That insight is that context largely determines what is written, painted, sculpted, sung, or performed".

REVELATIONS

When student composers are left to *create* according to their own designs and motivations, what often results are creative reinventions that are to a large extent demonstrations of skill and a statement of social identity. They follow a path of competency rather than creativity; familiar workflow is invoked utilising tried and tested patterns, timbres and harmonies within comfortable software or environments that have resulted in past successes, either commercially or academically. Why would one not resort to experiential skills and knowledge that has been developed perhaps over a number of years? is it not their right to make use of the very characteristics that define their individual expressions? Sometimes this expression is irrevocably associated with physical gestures upon a musical instrument or particular piece of equipment as a result of potentially many years of learning technique and repertoire (or patterns of behaviour). Creative decisions are made then according to a sense of aesthetic confirmation, producing work to suit known stylistic designs that will achieve a satisfactory outcome. The work is constrained to a great extent by expectation and imagination which are both governed by experience; creativity in this case would likely involve variation within the boundaries of stylistic consistency. Meaningful variation is commonly achieved through *inspiration* (involuntary ideas steered by musical intuition that arrive in the mind of the creator), or through improvisational, sometimes collaborative, chance discoveries. There may be of course be many different levels of creative achievement that will either correspond or transcend stylistic boundaries. Irrespective of the motivational reasons or processes of creative discovery it is common for outcomes to be governed by limitations or constraints of design inherent in the expression.

Musical and production limitations may be educationally designed to similarly increase focus, relieve anxiety and to some extent creative responsibility as to where to begin in a compositional task; failure then is not so inhibiting nor is closure as the exercises can be time limited:

- Limited number of instruments or tracks
- Limited instruments or tools
- Collaborative working
- Partial solutions offered
- Fusion of Styles
- Complete freedom in one dimension but constraint in another

The word 'constraint' in this context is not intended to be negative. When complete freedom is offered in an assignment, students seem naturally inclined to repeat past successes through operational conditioning. The exercises are designed to render re-creation is less likely and creativity a consequence. As a result the student is forced to solve a problem using unfamiliar criteria that may inevitably result in novelty, at least from the perspective of the student, and may reveal some hitherto unknown characteristic of the subject or process. There are generally six outcomes from implementing such constrained exercises:

- *Compliance 1* - accept limitation and develop novelty within constraint
- *Compliance 2* - try to recreate within constraints. Find the familiar within
- *Compliance 3* - but with *negotiation*; student accepts limitation up to a point then negotiates additions or inclusions which may include multimodal considerations
- *Negotiation* of new boundary conditions at the outset - testing the constraints
- *Inactivity* - demotivation and frustration
- *Complete non-compliance*... Disregard or oppose guidance

The objective is to provoke the student into an exploratory mode within which they may discover new perspectives that stimulate creative ideas. New ideas for the student may be assimilated in a number of ways: 1. *Substitution* - where an old practice element is replaced, 2. *Incorporation* - where the new practice is added, 3. *Redefinition* - where the whole creative approach is reconsidered as a result of the new ideas, and 4. *Development* - where the

student takes the new ideas and develops them even further. Not all students benefit, some find it ultimately easier to reject the new ideas and revert to older more successful practices.

The Beatles and George Martin created unique recordings by using a very limited palette of effects to manipulate recorded sounds and primarily used audio tape to achieve it. They would speed up recordings or layer multiple overdubs stacked to create a fuller sound and also explored new processes to manipulate and enhance the recorded sound, such as phasing, flanging, ADT (auto double tracking). It is clear from various interviews given by Martin, that they felt liberated by the freedom that tape-based manipulation effects had given them but, in fact, they were operating within a walled garden because of the inherent limitations of the technology. Is that the paradox of creativity, the illusion of freedom within a cage? Stokes (2005) recognised that masters of their domain only become creators when they impose novel constraints on their output; she suggested that progress can be made in a project by augmenting and developing the positive features whilst simultaneously diminishing the negative.

Figure 8 - Aesthetic Dialogue, adapted from Stokes (2005)

One of the greatest inhibitors to creative output in a modern recording environment is perhaps having no technical constraints. As Goldbeck (1949) expressed it: "The composer's chords are every dead or living composer's chords, never his own. His paper is never a blank, there are so many staves on it, five prison bars in each, History and Tradition being the jail…".

How do we know when a worthwhile discovery has been made? How do we know which strands of investigation to develop and which to discard? Is it possible to evaluate the potential of success early on in the creative process? Is the creative instigator the best person to make this judgement and at what point should the judgement be made, if at all? Educator and artist *Sister Corita Kent* was clear to differentiate between creativity and critique within *Some Rules for Students and Teachers,* a list established as a part of a project she taught in 1967-1968 at LA's Immaculate Heart Convent college:

> *Rule 8: Don't try to create and analyse at the same time. They're different processes.*

Leonard Cohen (quoted in Zollo. 2003) poetically expresses his perspective upon making a creative evaluation too soon in the process: *"The cutting of the gem has to be finished before you can see whether it shines."*

How do we know when a work of art is complete? It may be, as often is the case, that the deadline arrives as Pixar animator, director and producer Pete Docter said (see Usher, S.,2010) when quoting colleague John Lasseter: "Our films don't get finished, they just get released." Deadlines can be very useful devices that may be also internally administered since it can be difficult, especially if working within digital media to declare a work complete. Whereas the role of the producer is generally to complete the entire process by the set deadline, there may be advantages in a work not being completed as hinted at by Yoko Ono (see Richardson, 2007): *"I always believed that my work should be unfinished in the sense that I encourage people to add their creativity to it, either conceptually or physically."*

CONCLUSION

Artists may wish to consider their work a free and individual expression unfettered by audience expectation or priori considerations; this is for some a significant motivator; artists are inspired by great works and successful creative minds of the past, but ultimately seek to express a personal, unique and resonant message. To what extent are artists bound by prior structural conditions? expressive, technical or otherwise and is there any virtue in raising awareness of these features? How does one learn to create art? It is not uncommon for students to validate their

creative ideas by asserting its expressive credentials or declaring it as a product of the free imagination; but products of inspiration are invariably never outside the domain with which the artist is associated. There may be aspirational ideals that steer the expressive voice to explore more remote domains but to what extent may the product regarded as *authentic*. Within artistic educational institutions students are indoctrinated through studying the work of past masters, to develop technique and absorb philosophies; this is initially achieved through, environmental exposure, structured observing/listening and technical imitation, encouraging the students to secure identity and ownership in the pursuit of increasingly idiosyncratic approaches developing a personal expressive voice. How does this work in practical terms? It may involve, in particularly enlightened institutions, the consideration of the creative space within which play and experimentation is encouraged. Csikszentmihalyi (1996) states that *"it is easier to enhance creativity by changing conditions in the environment than by trying to make people think more creatively"*, nevertheless creativity is a process, a way of thinking than can be enhanced through the adoption of certain identified behaviours, and awareness of the mechanisms of creativity may ultimately diminish the inhibitors to it. Csikszentmihalyi (1996) also states that *"genuine creative accomplishment is almost never the result of a sudden insight, a light-bulb flashing on in the dark, but come after years of hard work"*.

The authors have attempted to heighten awareness within the undergraduate population of the creative process and its mechanisms, to produce a model (see Figure 9) of its operations that invoke a series of practical and applicable strategies. The fundamental model is threefold involving: 1. *Inspiration* - where the creative process (see Figure 7) is activated, 2. *Exploration* where the student access a toolkit containing a series of provocations and 3. *Experimentation* - where the student is encouraged to invite *extra-musical* features into the process. Throughout the process the students are encouraged to reference the outcome aesthetically developing a sense of what is stylistically appropriate.
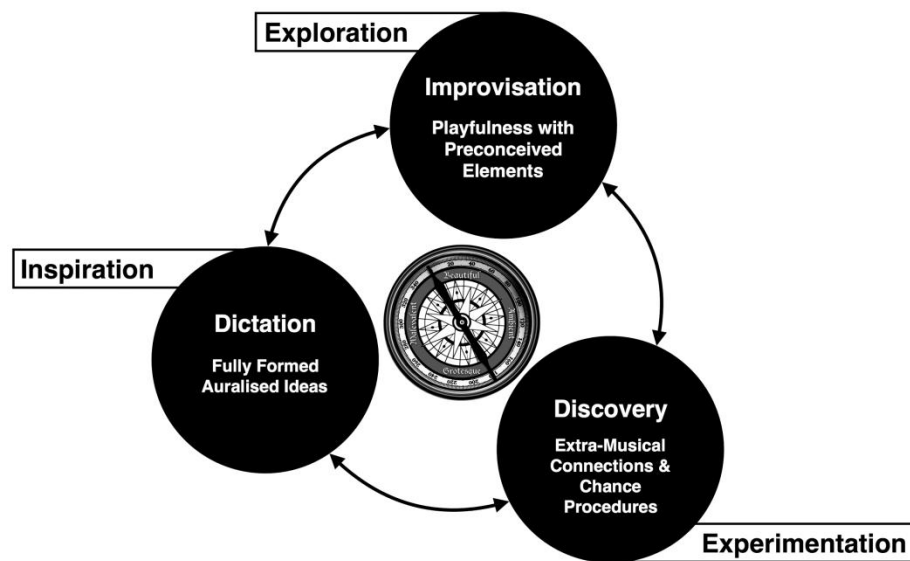

Figure 9 - Aesthetic Compass

For the *Exploration* and *Experimental* approaches, structures are provided (see Figure 10) to stimulate creative progression. Each structure contains a series of ideas, scenarios or starting points designed to provoke creative activity:

EXPLORATION	EXPERIMENTATION
Consider Space	Change Scale or Perspective
Critical Evaluation of Others	Translation
Repetition	Defamiliarisation
Transformation and Variation	Continuity
Constraints - Limitations	Failure and Destruction
Improvisation	Indeterminacy and Chance Mechanisms
Centonisation	Algorithmic and Automated Processes
Juxtapose Stylistic Attributes	Invite Naivety
Analyse and Deconstruct a Role Model	Divergent Exercises
Collaboration	Extended Techniques
Imitation	Extra-Musical

Figure 10 – Creative Provocations

It may be too soon to evaluate whether such lessons in creativity will have a meaningful and lasting impact upon the futures of undergraduate students in music and music production, but the lessons are very well received and the students report the benefits of the activity; the work will continue.

"It may be that when we no longer know what to do,
we have come to our real work,
and when we no longer know which way to go,
we have begun our real journey.
The mind that is not baffled is not employed.
The impeded stream is the one that sings."
"The Real Work" by Wendell Berry, from Standing by Words. ©1983

Authors' Brief Bios
Michael Brown is the Programme Leader for the BA (Hons)Music degree programme within the School of Arts, at the University of Derby in the UK. He holds diplomas in Art and Music, a BSc (Hons) degree in Software Engineering, Mathematics and Music, and a Master's degree in Contemporary Composition, which combine to serve his interest in computer creativity. He is a researcher within the school with over twenty-five years of teaching experience, an active artist, composer and musician. His principal research interest is in the area of creativity; he has collaboratively investigated relevant theories and developed applicable strategies, in relation to the Arts and particularly Music, for implementation professionally and educationally. He has over the past few years explored a variety of related strands of investigation and has disseminated his findings on multi-modal creativity in Europe and the USA where he is an active member of the American Creativity Association. Ostensibly his core objective is to assemble a body of work that constitute a *toolkit* of applicable creative approaches that serve to offer insight into the creative process and potentially help to cultivate environmental conditions within which creative ideas may be more forthcoming.

David Paterson is the Programme Leader for the BSc(Hons) Audio Engineering degree at the Perth College campus of the University of the Highlands and Islands in the UK. He holds a BSc degree in Audio Engineering and a Master's degree in Education. David has extensive music industry experience and has collaborated in many successful projects over twenty-five years as an engineer and producer. He has industry recognition as a producer

winning UK best blues album and a nomination in the prestigious Mercury Music Prize. As an academic, David's interests are in developing and nurturing creativity within a studio environment amongst musicians and his students. He is exploring the development of possible frameworks that encourage creativity that can be adapted by both musicians and sound designers. He has also researched into the pedagogical benefits of remote audio connections between distant campuses. He is exploring the development of possible frameworks that encourage creativity that can be adapted by both musicians and sound designers.

Bibliography
Baer, J. (2012) *Domain Specificity and the Limits of Creative Theory*, The Journal of Creative Behaviour, Vol. 46, Iss. 1, pp. 16-29
Barron, F. (1969) *Creative person and creative process*, New York: Holt, Rinehart, and Winston.
Barron, F., Montuori, A., and Barron, A. (1997) *Creators on Creating: Awakening and Cultivating the Imaginative Mind*, New York: Tarcher/Penguin, Print
Bernstein L. The Unanswered Question: Six Talks at Harvard (Charles Eliot Norton Lectures). Cambridge, USA. Harvard University Press. 1990, Print
Byrne, D. (2012) *How Music Works*, San Francisco [Calif.]: McSweeney's,. Print.
Clifton T. (1983) *Music as Heard: A Study in Applied Phenomenology*. New Haven and London: Yale University Press.
Copland, A (1959) *Music and Imagination*, Mentor Book, Harvard University Press, USA. Print
Corey, J (2010) *Audio Production and Critical Listening*, Oxford: Elsevier, Inc. Print.
Csikszentmihalyi, M. (1996) *Creativity: Flow and the Psychology of Discovery and Invention*, New York: HarperCollins.
Goldbeck, F (1949) *Music Today*, edited by Rollo H. Myers, Journal of the International Society of Contemporary Music, p.110., Denis Dobson, London
Goldman R. F. (1964) "Varèse: Ionisation; Density 21.5; Intégrales; Octandre; Hyperprism; Poème Electronique. Instrumentalists, cond. Robert Craft. Columbia MS 6146 (stereo)" (in Reviews of Records). Musical Quarterly 47, 1961. no. 1. (January):133–34.
Guilford, J.P. (1967) *The Nature of Human Intelligence*, New York: McGraw-Hill. Print
Hepworth-Sawyer & Hodgson, J. (ed.) (2017) Mixing Music, Abingdon, Oxon: Routledge, Print.
INART 55, *History of Electroacoustic Music: Edgard Varèse (1883–1965),* Available onlne at: http://www.personal.psu.edu/faculty/m/e/meb26/INART55/varese.html <accessed 10th April 2017>
Kim, K.H. (2006) *Can We Trust Creativity Tests? A Review of the Torrance Tests of Creative Thinking (TTCT)*, Creativity Research Journal, 2006, Vol. 18, No. 1, 3–14
Koestler, A. (1964) *The Act of Creation*, Arkana Penguin Books, London. Print
Music and The Drama, Varese, Ultra-Modernist Composer, Prophesies Symphonies in "Space", The Lewiston Daily Sun, December 8, 1936. Available online at: https://news.google.com/newspapers?id=isEgAAAAIBAJ&sjid=qGoFAAAAIBAJ&pg=2977%2C5415202 <accessed 10th April 2017>
Richardson, M. (2007) Pitchfork, Online interview available at: http://pitchfork.com/features/interview/6541-yoko-ono/ <accessed 10th April 2017>
Sawyer, R.K., & DeZutter, S. (2009) *Distributed Creativity: How Collective Creations Emerge From Collaboration*. Psychology of Aesthetics, Creativity, and the Arts © 2009 American Psychological Association 2009, Vol. 3, No. 2, 81–92
Sternberg, R.J. (1999) *A propulsion model of types of creative contributions.* Review of General Psychology, 3, 83-100.
Stokes, P. (2006) *Creativity from Constraints - The Psychology of Breakthrough.* New York: Springer Pub. Co.
Stravinsky, I. (1982) *Poetics of music in the form of six lessons*. Cambridge, Mass.: Harvard University Press.
Usher, S. (2010) Letters of Note, Online blog Available at: http://www.lettersofnote.com/2010/06/pixar-films-dont-get-finished-they-just.html <accessed 10th April 2017>

Wallas, G.(1926) *The art of thought*. New York: Harcourt.

Young, D. (2006) *David young: producing uncertainty.* Contemporary Music Review, 25 (4), pp. 379--392.

Young, J.W. (1965, reprinted 2003) *A Technique for Producing Ideas*. New York: McGraw-Hill

Zappa, F & Occhiogrosso P. (1989) *The Real Frank Zappa Book*, Simon and Schuster, USA, Print