REFLECTIVE QUALITIES OF THE ARTISTIC
CREATIVE PROCESS AND CHAOS THEORY: A STUDY
OF THEIR RELATIONSHIP AND THE IMPLICATIONS
FOR ART EDUCATION AND TEACHING


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I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a higher degree to any other University or Institution
(Signed)___________________________
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ABSTRACT

What is visual art making, the artistic creative process, and how does it work? These questions fuelled an investigation at first theoretical, then incorporating an empirical study centered on attaining understanding relating to the elements and dynamics involved in making visual art. The resultant study aims to offer an approach to gaining comprehensive understanding of the artistic creative process, an understanding that may inform art teaching practice, so that art teachers may better understand the related dynamics of their pedagogical processes.

Historically the artistic creative process has been accepted as one consisting of different sequential stages of development. This view however, is evolving due to the growing understanding of interrelated dynamics of life processes offered by, for example, neurological studies of the brain. New thinking links earlier philosophical and psychological ideas presented by such thinkers as James (1894) and Dewey (1934), to the work of Baars (1999), Brown (2000), Ellis (1999), Zeki (2000), in offering a deeper understanding of the natural human creative process. The reflective aspect of the artistic creative process is thus related to the way that we process information every minute of our lives; essentially it is the way we progress through life, minute by minute, learning and evolving, affirming self through finding meaning.

Study of current theory relating to the processes of the brain inevitably incorporates modern thinking that revolves around dynamic processes. Originating in thermodynamics, Chaos Theory has travelled far from physics to become incorporated into a broad spectrum of disciplines. It offers a common language that relates to the dynamics of human nature, and as such is totally applicable to areas of learning and human interaction. Here used metaphorically, Chaos Theory serves to elucidate interactive aspects of the discipline of art making, with much to offer an understanding of the artistic creative process as it describes exactly the same process of change and growth through experience.

A metaphorical use of the language of Chaos Theory provides visual art making with a means of sharing ideas with other academic disciplines that also constantly deal with the dynamics of the human condition, found for example in the close connections between the methods of exploration of both artists and scientists. In studying the phenomenon of ‘scale’ the physicist Feigenbaum commented on the
connections between perceptions of artists and those of scientists, pointing to the way in which their perceptions and analysis of things coincide (Gleick, 1987). The visual analysis evident in the work of Turner or Ruskin reflects the same process of detailed conceptual exploration of material collected by the senses as that of a student of any field of scientific exploration. Chaos Theory is important also in that it provides a language accessible by varying levels of expertise, whether at a simple metaphorical or a more sophisticated level. This work charts these dimensions because “The challenge is to reverse the disconnectedness of the present world and to develop a curriculum that is not based on separateness of knowledge from life and being, but upon their inherent unity and integration” (Lovat and Smith, 1995, p.248).
INTRODUCTION

This project is at once a synthetic and analytic work, speculative, and observational. It aims to provoke thinking about the teaching of art, and the role of art in education. In the first two dimensions, - synthesis and analysis - it draws together in thematic form a wide-ranging literature, in a fashion that seeks to identify in detail and hold up for consideration the different elements that work together in the process of art making. That exercise is augmented by an empirical project which goes to the actual activity of art making in practice: observations of artists as they make an artwork, and dialogue with them concerning theirs and the researcher’s understanding of their own processes.

The project is speculative in terms of a well-founded view drawn from considerations of the literature relating to artistic creative process and Chaos Theory as these bear on the reflective process, and the information reviewed regarding artistic practice. This view promotes the usefulness of Chaos Theory concepts in clarifying understanding of the activity of art making. It is provocative in challenging previously accepted ideas on understanding artistic creative process, through the weight of literature, the quality of argument and analogy in that literature, and a coherent interpretation of observational data here derived. And, finally, whether the dimensions and their interrelations that Chaos Theory postulates are ‘found’ or ‘fitted’ to the process, there are challenging implications for art teaching, and for thinking about art in education for, and in, Life.

The work as a whole, through its comprehensiveness and multifaceted approach to the issue, will serve to contribute to an advancement in understanding of art making as a development of a natural creative human process that may be enhanced by means of art teaching.

In outlining what is to follow in the three parts of this dissertation it is first important to note that the basic thesis of this study is that the reflective element of artistic creative process facilitates all else in individual artistic self-expression. This process is considered in relation to Chaos Theory in anticipation that the complex way that artistic expression works may be elucidated by metaphorical reference to Chaos Theory concepts and terminology. It is therefore possible that these concepts may
provide an accessible and open form of structured order to an art maker who seeks, through teaching, to encourage others in attaining meaning through art making.

The three parts represent, respectively, an effort to draw together, in the above terms, a wide-ranging literature, a ‘free-standing’ empirical project, and a consolidation of the theoretical and empirical through a focus provided by the educational context.

In Part A, Chapter One, artistic creative process literature is explored in order to pull together ideas and gain insight into current understanding on the structure of the process. Chapter Two introduces Chaos Theory concepts in metaphorical form as they may be found to relate to fields other than ‘pure science.’ Chapter Three considers links and connections between artistic creative process and Chaos Theory concepts. Consideration of the foregoing theory led to the conclusion that further elucidation of the artistic creative process may serve to illuminate what actually happens when we make artworks. Chapter Four therefore focuses on the areas that appear to be of most interest when considering the reflective process involved in art making, those of immersion and incubation. These two areas are aspects of the creative process that involve the artist in the processing of newly absorbed information in conjunction with that previously acquired. Chapter Four illuminates the dimension of knowing and reflection that is crucial here, by reference to contemporary work in the field of consciousness studies.

Part B consists of an empirical study that explores the creative processes of a number of practicing artists. Chapter Five describes the project, whilst Chapter Six contains the research report and conclusions. Synthesis of the information collected here, considered in relation to the findings of Part A, is aided by use of the computer software ‘Nudist-4.’ In order to achieve an understanding of the interrelatedness of the complex process, data has been subjected to a search for what appear to be the most important aspects of the processes by all concerned, followed by an explanation of these aspects by means of the most appropriate language, that is, with reference to Chaos Theory concepts. This process resulted in a diagram that illustrates those interrelated activities that appear to be involved in artistic creative process, according to synthetically evolved definitions. This provides a guide to the variable elements that may be encountered in relation to artistic creative process, rather than providing a strictly invariant model. The variable quality of these elements from one occasion to
another leads one to recognise the ever-changing character of artistic creative process as a naturally ordered structure that is suitably described in Chaos Theory terms.

Part C approaches the area of art education in relation to the results of Parts A and B. Chapter Seven offers a recent history of Art Education, and Chapter Eight offers ideas on possible new reflective directions. Chapter Nine contains a discursive conclusion on the whole work.

A CD Rom is provided as an adjunct to the printed work, as it contains appendices to support the study. These consist of empirical data, interview transcriptions, field notes, and photographs, pertaining to artist participants and their creative work processes, information relating to research methodology, and a comprehensive Bibliography offered as a scholarly resource. There is also an example of a self-organized curriculum that was developed in connection with experience in community based teaching.

This study offers an understanding of the underlying structure of a process which is in itself variable according to individual and group ontogenies and contextual elements. The elements that comprise the creative process are universal, in that they form an integrated natural human process, and as such function within the structure of our ever-changing human boundaries. A diagram of a process such as that which has emerged from this study may provide heuristic reference when contemplating concepts that have learning implications for those designing a curriculum, a syllabus or a lesson plan. Such conceptual references may be born in mind when actively teaching artistic creative process through art making, thus enhancing teacher-student understanding.

Significantly, this project itself developed as any self-organizing creative process may be expected to, by working within continually expanding structural boundaries, developing according to the growth of ideas as the project progressed, resulting in a truly reflective creative product. It is chaotic in character, being open-ended in aspect and projection of ideas.

The creative process initiated by this work is reflected in the Afterword and the section on the CD labelled Researcher Interpretations. These refer to some of the artworks produced by the researcher while this project was in progress, which are offered as concurrent artistic reactions to the material encountered by the researcher, as a supportive interpretation to the written word.
PART A: ARTISTIC CREATIVE PROCESS, CHAOS THEORY, AND THEIR CONNECTIONS
Koestler (1964), in his search for the intrinsic nature of creativity strove to discover a common basic pattern in creative activities. He sought to isolate phenomena relating to creative originality found at all levels of human achievement. Indeed, specific strategies for developing creativity through the creative process are discussed by many authors on the subject. They cite the experience of creative people from all fields, for example, the mathematician Henri Poincare (1854-1912), the scientist Isaac Newton (1642-1727), the painter Eugene Delacroix (1798-1863), the author Anton Chekhov (1860-1904) (Ghiselin, 1952; Koestler, 1964). Literature that is written by or about creative people provides descriptions of their frustrations, joys, and sheer hard work, and projects commonalities of experience from which we may learn.

**PRINCIPLE ELEMENTS**

The creative process varies in detail from one individual practitioner to another due to their differing personal histories. However, it is interesting to note that many who are willing to discuss their creative processes are intensely aware of the elements of their experience (Barnes, 1992; Chipp, 1968; Freeman, 1970; Goldwater and Treves, 1945). Artists’ involvement in explaining how the creative process functions provide a direct source of reference that aids in an endeavor to understand how the creative process might function for everyone in their everyday lives (Ghiselin, 1952; Hawley, 1993). Although there are varying descriptions of the creative process, all sources agree that there are several stages of activity and they are each described in similar ways (Strickland and Coulson, 1996). The stages of the creative process are regarded as universal, despite individual differences and the consideration that the various disciplines may use different names for the various contributing elements.

According to Abbs (1994) an early notion of creative process was named by Socrates the ‘elenchus,’ and was described as beginning with:

- the experience of floundering in a sense of not knowing,
- followed by a desire to discover,
- leading to reflective discovery.
Dewey (1934) refers to the stages of a creative process as phases in a rhythmic process, whilst Patrick (1937) describes four stages of creative thought that are listed as follows,

- **preparation** or **immersion** in a topic, in order to gain information about that topic, Patrick describes this as a “period when associations are shifting rapidly and the subject is receiving new ideas (Patrick, 1937, p.70).
- **incubation**, or rest, in order to assimilate the new information, and subconsciously search for meaning, resulting in
- **illumination**, a seemingly spontaneous reaction - this may take from moments to years to achieve
- **verification** or revision, through interpretation of ideas.

Art making is a personal process, developed by an individual, wherein all the above stages may overlap. For example, immersion may incorporate incubation, or acts of revision to the work may occur before it is completed, entailing repetition of stages, not necessarily in the order stated above. In fact, they are each considered likely to be repeatedly visited throughout the art making process (Patrick, 1937).

Those writers who are most involved in writing specifically about art making, as opposed to art criticism, do not appear to include as a stage of the creative process the evaluation of the artwork by people other than the artist (Dewey, 1934; Finke, Ward, and Smith, 1992; Mumford, 1998).

However, Abbs (1994) makes a different summary of stages of creative process that includes all forms of artistic expression. When discussing art making he ascribes three stages to the process that include, in addition to those previously cited, the component of social involvement. They are,

- expressive impulse - biological and affective impulses - the impulse for symbolic representation
- the artist engages more fully with the medium of expression and connection with the "inherited symbolic order of art" which includes past achievements and failures, and. the "self and nature" of the person
- realization of the final form of the work reaches out and stands alone. There is an aesthetic response from others, followed by the work being evaluated and taken into the culture (Abbs, 1994,pp. 101-102)
This description goes a step further than that of Dewey (1934) or Patrick (1937), in that it hands the results back to the culture, which perhaps provided the initial influences on the work. It is a description of creative process that takes as its basis the biological need for expression. It includes reference both to the personal history of the artist and the evaluation of the final work by a culture. These elements are all deeply relevant to this study, and are incorporated into later sections of the discussion.

However, the stages of creative process named by Dewey and Patrick, because they represent the most often used list of stages of creative process, will form the starting point for discussion. To reiterate, these are preparation by immersion in information on an object of study, followed by a period of incubation of ideas, leading to illumination, or understanding, or findings that become verified by the making of a concrete product, an interpretation. This may equally well take the form of an artwork or a scientific experiment. There is also the proviso that all these stages are understood to interact as the work is in progress. At the same time as the product is technically being made, thoughts and ideas are being influenced by the making process itself. Finally, there is a stage of evaluation, whether solely by the individual concerned as a part of a personal review of progress, or by a section of the society or culture to which the creator belongs, or both. This may involve sharing work in some way, perhaps exhibiting artworks, at which time it may come under the scrutiny of ‘critics’ of all types.

Preparation: Immersion

The literature on the topic of creative process shows a major tendency towards emphasizing the initial need for gathering information about a topic, and gaining knowledge through experience, as integral elements of the creative process. Experience, for example in art making, in using various art media in order to interpret a particular topic, provides both intellectual and practical artistic knowledge. Dewey (1934) writes extensively of the important part played by knowledge gained from experience in the creative and expressive activity. Particularly relevant to art is the experience gained through sense impressions, which is discussed by Dewey (1971), Foss (1994) and many other writers as a basic source of empirical knowledge used in the creative process. Eisner (1985) refers to information gained by the senses as providing input for an ‘Aesthetic Way of Knowing’.
A different experience is described by Richter (1964) when writing of his involvement in the events of the Dada art movement of 1915-1920. Richter (1964) describes how he relied on 'chance' as a starting point for pieces of spontaneous artwork, with no conscious reference to prior knowledge. However, it is interesting that Richter notes later in his book that as the work developed it began to form a pattern and carry reference to previous work. Also of note in this context is the fact that the influence of his work lived on to emerge in Pop art years later, a result of knowledge absorbed by the culture. Similarly, in reading of the film director Fellini's experiences of his own creativity he appears to have been wholly reliant on spontaneity inspired by chance, indeed he makes no mention of the relevance of prior experience or learning in his work (Bachman, 1994). Fellini describes starting his creative development from 'flashes of enlightenment' that lead him on to explore a topic through the medium of film-making (Bachman, 1994). However, it is difficult to discount any prior gathering of knowledge in these cases, even if their reactions to life's challenges are counted as their sole relevant experience (Arieti, 1976).

Mumford (1998) stresses the importance of gathering knowledge at the beginning of the creative process in his model for understanding creative thought. He too refers to Dewey and the importance of experience in creating knowledge. Dewey (1934) wrote of creative expression as the result of a new idea connecting with the knowledge gained through previous experience. The acquisition of knowledge appears to be an essential element of the creative process, and one worthy of further exploration in the search for answers relating to how the creative process works (Piaget, 1971).

**Incubation: I - A State of Mind**

Comparison of various forms of theoretical analysis of the creative process shows that some are more cognitively based than others (Csikszentmihalyi, 1996). The more cognitively based ideas tend to relate to conscious problem solving, whilst a different emphasis is placed by many writers on analysis of the process of accessing the area between the conscious and subconscious, in order to initiate creative mental activity. This last is analogous to the incubation phase of the creative process, and possibly the seat of an activity of the mind often referred to as the ‘imagination,’ or as ‘intuition’ (James, 1890a; Rugg, 1963; Stevens, 1999). ‘Intuition’ is a term closely associated in the literature with the incubation aspect of the creative process, often in a
description of experiences of sudden understanding. The experience of sudden intuition is described by many creative people as that of ‘flashes of inspiration,’ often seemingly unconnected to a current activity (Ghiselin, 1952; Maslow, 1970; Stevens, 1999). Dewey described experience of this activity as that of unexpectedly reaching a sense of harmony, involving all aspects of consciousness in an interrelated way.

The meeting of the old and the new in which the readjustments involved in every form of consciousness are affected suddenly by means of a quick and unexpected harmony which in its bright abruptness is like a flash of revelation; although in fact it is prepared for by long and slow incubation --- when old and new jump together --- there is intuition (Dewey, 1934, p.266).

In discussing the experience of creative process of thirty-eight creative writers, artists and scientists, Ghiselin (1952) indicates that creativity does not result from conscious processes alone. As an example of preconscious process in action he refers to the experience of Poincare, who is reputed to have said that at the height of spontaneous creativity he was conscious of the process, but not consciously in control of its progress. Poincare carefully analysed his experience of conscious and unconscious interaction, acknowledging a satisfaction in his lack of conscious control over the freedom of seemingly disordered thoughts by concluding, “disorder itself permits unexpected combinations” (Ghiselin, 1952, p.31).

There is a copious amount of literature on the pre-conscious process, considering the topic from a variety of viewpoints. Kubie (1958) takes us back to the evolutionary origins of the brain's processing. He emphasizes the need to cultivate the preconscious area of the mind, believing it to be vital for survival, because it keeps us in touch with our natural processes. Understanding the preconscious processes is considered to provide the ability to recognize our own inner strengths and to balance and rebalance information and attitudes towards our environment. Kubie (1958) considered the preconscious to be the most important part of the structure of knowledge processing, as it holds the balance between processing held to take place in the subconscious area, and the activities of the conscious mind. This view of the preconscious takes us closer to a holistic understanding of the interrelatedness of processes of the human mind.
According to this literature, incubation appears to be a stage of the creative process when ideas form in a ‘part of the mind’ that is not on a level of conscious awareness. Rugg (1963) developed a 'theorem of the transliminal mind' that focused on the threshold of consciousness as the connection between the unconscious and conscious minds. Rugg (1963) believed that this threshold between conscious and unconscious is the place of creative imagination. He also came to see the mind as a continuum of conscious and non-conscious processing. The ideas of Rugg (1963) are similar to those of Kubie (1958) who both believe that it is the preconscious state of mind that frees the whole mind from the strictures of consciousness, allowing free association of ideas. This is understood to occur when the mind is in reverie or daydream mode, free of inhibitions and conscious blocks, similar to that commonly understood to take place in the creative process of artists.

Rugg (1963) considered that the place where this activity takes place is similar to that of the Taoist 'no-mind,' existing on the threshold between conscious and subconscious states of mind, forming a "transliminal antechamber, (p.292). He compared the processing that takes place in the preconscious state of mind to that named 'free association' by Freud. It is the "preconscious state that frees the searching mind from rigidity" (Rugg, 1963, p.214). Rugg described the mode of knowing accessed in this way as "the intuitive, inside identifying way” (Rugg, 1963, p.35).

This working state, of mind, or brain, involving experience of something below the level of conscious awareness has acquired various names. Rugg (1963), Stein (1974), and Dixon (1981) refer to it as the ‘preconscious,’ Goleman (1996) as the ‘precognitive,’ Dorfman, Shames, and Kihlstrom (1996), as ‘implicit cognition.’ Polanyi (1969) referred to this phenomenon as the ‘tacit’ mode of knowing and Madison (1998) labeled it ‘synthesis mode.’ To the conscious mind it is a knowing that feels instinctive, perhaps ‘intuitive’ (Cytowic, 1993).

Austin (1998), a neurologist, explains the connection between the physical function and Zen meditation as a means of accessing the preconscious area of processing in the brain. He sees this area of activity as one where ‘intuition’ emerges. It is an activity of the brain or mind, consciously accessible through meditation. Austin (1998) discusses people actively seeking access to the preconscious state of mind, referring to the correlation between activity of various brain rhythms and the different
associated states of mind. Meditation is found to affect these rhythms, leading to control over specific states of mind (Austin, 1998).

Laverne (1996) a musician offering her own practical recipe of creative principles, encourages all musicians to attempt reaching the ‘alpha' state of mind, a certain rhythm of brain waves, wherein may be accessed the merging of conscious and subconscious activities. The biochemical reason for this state is understood to be the release of endorphin in the brain. In order to encourage this state Laverne suggests the need for a purpose or goal; and a need to achieve clarity of thought and simplicity of concept. This process is a means of preparatory access to a creative state of mind. There is no mention by Laverne of accessing stored knowledge, but she reflects a belief in an ability to access this highly developed creative process by means of encouraging a certain brain rhythm, thereby encouraging preconscious processing of mind. Listening to Baroque music whilst working is also thought to encourage access to the preconscious, as it is believed to hold rhythms that encourage the ‘alpha’ rhythms to develop in the brain (Gregory, 1996).

Another route to this state of mind is suggested by Madison (1998), who presents a number of exercises, also intended to help the mind to produce alpha waves, thus reaching the brain's ‘synthesis mode.’ In this way, he believes it is possible to access both the conscious and subconscious for information. Many writers on the subject consider this ‘mode’ to be the truly essential creative state of mind. As previously mentioned, Both Austin (1998) and Wertenbaker (1997) advocate the use of meditation to access this state of mind, both offering physiological evidence in support of this recommendation. They show that meditation seems to result in more synchronized brainwave activity, resulting in higher states of awareness. In this way harmonization of the electromagnetic rhythms of the brain as the result of deep concentration, or a meditative mode of thought, allows access to a mental working environment, which is believed to be conducive to the creative process (Austin, 1998; Wertenbaker, 1997).

There are then, powerfully suggested links occurring in creative process literature between psychology and philosophy of mind and the physiological processes of the brain. This appears to be the result of an attempt to develop a more holistic approach to understanding the links and connections between the various aspects of creative process. This is particularly appropriate and unavoidable when considering art
making, as it is itself a holistic activity that combines both mental and physical aspects of human function in a meaning-making activity, all of which are held in a fine balance (Austin, 1998; Palmer, 1998; Zeki, 2000).

Study of the processing of the mind and brain continues to be extensive, as scientists, psychologists and philosophers of many disciplines from medicine to sociology, and the arts, attempt to analyze and explain its structure and functions. In general terms, for a long time the conscious mind has been regarded as separate from the subconscious, the conscious primarily involved in concrete experience; the subconscious mind viewed as a storehouse for memory and knowledge; whilst the preconscious has been considered as the link between the two. The preconscious continues to be thought of by many as the place where meaning is sought, because it is where synthesizing of information appears to take place, on the edge of conscious awareness (Haworth, 1997, 1990; Kubie, 1958; Maslow, 1970; Stein, 1974).

In addition, the state of mind necessary for incubation to take place during the creative process provides an environment for an activity that involves continuous synthesizing of information on the edge of awareness.

Incubation: II - Working ‘On-Line’: Continuous Reflection

Making art involves constant synthesizing of newly acquired information as the making process progresses. There appears to be a continuous reflective process taking place. In an explanation of the continuity of creative process that does not mention a preconscious state of mind, Havelka (1968) describes the working creative mind as oscillating between the conscious and the subconscious. The mental tension so created achieves new integration of elements from the two processes, thus ending the tension and producing creative results. This presents a description of the incubation process as continuous, and perhaps more closely related to the way artists actually experience this activity in art making (Ghiselin, 1952).

Consideration of the functions of a preconscious state of mind discussed above provides a possible means of understanding the continuity of the artistic creative process that incorporates both mental and physiological human functions. For example, the improvisations of jazz musicians appear to be spontaneous and continuous, but of interest is the fact that the acquisition of knowledge in this field seems vital. On analysis the work of Charlie Parker, "recognized as the greatest improviser in modern
jazz" appears to contain much reference to the work of previous musicians (Weisberg, 1999, p.237). Consequently Parker's music reflects deep immersion in the past, in acquired knowledge of the theory and conceptual skills of music, and immersion in knowledge gained through much practical experience. He worked from a large repertoire of learned formulae, incredibly quickly. Weisberg writes that we are left "with the question of how the memory works 'on-line' during improvisation, about which nothing is known at present," (Weisberg, 1999, p238). However, if Parker was indeed working at a preconscious level, then his access to previous knowledge being reached through free association of ideas offered by preconscious processing would make sense of his ability to 'improvise.' The continuous synchronization of thoughts, ideas, and control of practical interpretation appear to be involved in this process.

Experienced visual artists also work in a continuous way in their creative processes, accessing the knowledge needed in their work quickly, and working directly onto a surface. Dewey quotes Van Gogh, speaking of the depth of involvement in his work, "emotions are sometimes so strong that one works without knowing that one works, and the strokes come with a sequence and coherence like that of words in a speech or letter," (Dewey, 1934, p.85). Dewey explains that in the creative expressive process, images, observations, memories, and emotions undergo change as the artist works the materials. This involves a process of reflection in a combined operation of mental and physical activity. As a writer composes in words, a scientist in mathematical formulae, so an artist composes in a chosen medium (Dewey, 1934; Ghiselin, 1952).

Mumford (1998) may appropriately explain the situation of an artist at work. He suggests that research has shown that the artist repeatedly moves from the conscious to the subconscious, and back again, whilst involved in the creative expressive process, therefore only an integrative model of cognitive thought may adequately explain the process. Mumford (1998) has produced such a model, describing the creative thought process, which allows access to the process by both novices and experts, and pertains to all cognitive abilities and styles. It is comprehensive in concept, reflecting the variety of types of creative practitioners, and the possible paths of interaction that may occur within the creative process.
Verification: Artistic Expression: Interpretation

The third recognized stage of the artistic creative process is that of verification, which refers to interpretation of ideas developed during incubation. Art making serves to express or interpret ideas in concrete forms, as the direct result of preparation and incubation stages of the creative process. As may be understood from the foregoing paragraph, artistic expression or interpretation appears to be the result of a continuous creative activity. It reflects immersion in an area of interest, and consideration of connections between knowledge received in this way with previously acquired knowledge, taking place below the level of awareness during a period of incubation (Dewey, 1971; Ghiselin, 1952).

Evaluation

Evaluation is another integral part of the continuous artistic creative process of art making, as it also takes place whilst the artist is working. The artist appears to be constantly oscillating between states of mind, and this involves continuously making decisions that evaluate the qualities of the work, based on continuous growth of knowledge and understanding reflected in the work as it progresses (Havelka, 1968; Mumford, 1998). At the end of a piece of work, an artist may choose to stand back and evaluate the final product. Alternatively, they may leave this until later, when a fresh frame of mind may result in a different evaluative judgment (Friedenthal, 1963; Ghiselin, 1952).

Another aspect of evaluation of artwork is situated in the public or cultural arena (Abbs, 1994). Reaction to an artwork may vary according to the particular culture in which the artist participates. In some cultures art forms are a vital part of their religious ceremony, encouraging spiritual participation of all members of the society through paintings, sculptures, or architecture (Dissanayake, 1988; Gombrich, 1972; Highwater, 1979, 1981). For example, in Western Society the culture of the Christian Church has had a great influence on the development of artworks, and on whole movements of art, especially since the time of the Renaissance (Gombrich, 1972). In other societies of the world artworks are evaluated according to how well they reflect the spirituality of their members, through decorated artifacts attached to religious buildings, or homes, or on articles used for everyday activities, such as cooking utensils, or hunting implements.
Meaningful decorations and artworks surround people living in everyday situations (Dissanayake, 1988).

In Western Society visual art appears to have become set apart from everyday life in some instances, with ‘Fine Art’ placed in galleries, where it leads an esoteric life of its own. This form of art is separate from involvement in everyday human life, in a place where only a certain select few are encouraged to visit and appreciate its attributes (Dewey, 1934). These works tend to be evaluated according to the attributes assigned by professional ‘critics’ of art, often for commercial purposes. However, this is not the only place where artworks considered ‘fine’ art are found in Western Society. In recent years there has been a reaction against such separatism, in the form of placement of more ‘fine art’ in public places, where it may be accessed by the community as a whole (Pohl, 1996). We see children climbing over sculptures in public parks, evaluating their shapes and forms by relating the art objects to their environments, enjoying the experience of their many attributes in a holistic way. Community members are also being encouraged to take part in creating living environments that contain their own artworks. People are learning to evaluate art within community on a different value level from that of the gallery environment (School Arts, 1998; Baker, 1990; Pohl, 1996). Consequently, the powerful concept of ‘place’ and ‘place-making’ has become an important focus for many artists (Goldsworthy, 1996; Graham, 2001).

Art teaching and learning is primarily based in educational establishments, such as schools, situated within the community, in touch with everyday life. Art found within the community in the form of design of everyday artifacts, buildings, and utensils is well complemented by the addition of ‘fine artworks’ to the community arena where they may be absorbed and become everyday symbols of the human experience of living.

**INFLUENCES AFFECTING THE ARTISTIC CREATIVE PROCESS**

The stages discussed by many writers are impacted by other factors and considerations. Important influences that emerge are emotion and culture.

**Emotional Influence**

"Feelings of knowing,” awareness of understanding offered by the senses, are present as the creative person searches for meaning as they create a piece of artwork (Ellis and Newton, 2000; Ippolito and Tweney, 1996, p.446). Emotion is a natural part
of the creative process, integral to the procedure, and present at every stage. This emotional, or affective, aspect of the process is included in Mumford's (1998) model of creativity, which develops from

- unconscious associational mechanisms, to
- activation of representation, resulting in
- affective allocation of attention, to
- representations providing the basis for conscious processing.

The implication presented by this model is that affect has an important place in the allocation of attention, but is reliant for its activation and involvement on the first two steps in the process. This order is be brought into question later when emotion is further considered, from the point of view that suggests emotion has a motivating force, or is an integral element of creative process. We will return to this issue of affect below, in discussion of the place of emotion in knowing.

Perhaps because the process is related to human need, strong emotions are often involved in the creative process. One such experience that is often described as emotionally related is that which accompanies sudden insights, when realization comes to the forefront of the conscious mind, to form an immediate sense of understanding. Dewey (1934) describes this experience well in the quotation referenced above (p.11). It has been described as a feeling that is like a sudden illumination of knowledge, often accompanied by feelings of elation. Writers on the subject describe these experiences as ‘flashes of inspiration,’ or as "sharp acts of hermeneutic perception" (Abbs, 1994, p.101). They have also been described as, "a primordially immediate pure image" (Chipp, 1968, p.615), and the sudden ‘sensuous apprehension of meaning’ (Abbs, 1994, p.64). Witkin (1974) describes this moment of realization and the process that anticipates it. He describes an emotional state of mind, and the existence of a "sensate impulse," which oscillates in the conscious mind with the urge to express. Then the two combine when the artist works with the chosen medium of expression, until the artistic statement is made (Witkin, 1974, p. 180).

These strong feelings are connected to the stage of discovery that is often at the height of a creative experience, but it is not to say that all creative experiences consist of sudden, deeply felt flashes of knowledge. More commonly an artist experiences growth of understanding with the gradual growth of an artwork, and the emotional sense of
satisfaction and understanding that comes with its final personal evaluation (Ghiselin, 1952; Hawley, 1993).

**Cultural Influences**

Koestler considered the creative process to be a universal process in "the evolution of individuals and cultures" (Koestler, 1964, p.16). In common with other writers on this topic, he regarded it as a natural process, which put us in touch with the basic experience of life (Austin, 1998; Dewey, 1934; Kuo, 1996; Maslow, 1968). This is particularly of interest when considering the educational potential of the creative process, and it links with Epstein's contention that all people have a creative capability (Epstein in Csikszentmihalyi and Epstein, 1999). His concept of the creative process is that it is a natural one, a part of us all, which has a linked biological and psychological basis (Csikszentmihalyi and Epstein, 1999; Klee, 1925). Dewey (1934), Dissanayake (1988) and Zeki (1998) all regard the creative art making experience as one reflecting a natural biological process, even as being "beneficial for a person's biological fitness" (Dissanayake, 1988, p.8). With even more emphasis, Richards (1996) considers creativity to be an important component of mental health.

Motivation for art making may be found in many forms within different cultures. As noted above concerning the evaluation of art, there is some difference today between various types of visual art, in ‘Western’ society in particular. Dewey (1938) wrote of the early close connection between what is today termed 'aesthetics', or 'fine art,' and its origin in everyday life within communities, when household articles were art forms found in every day use. In indigenous cultures, art and deep meanings associated with it are valid and significant, playing an important part in religious ceremony, but also reflected in carefully crafted and lovingly used everyday utensils.

In the Western culture work of the fine artist became no longer as integrated, due to the mechanical age of mass-produced articles. As discussed above, "Artists find it incumbent upon them to betake themselves to their work as an isolated means of 'self expression,'" with their work compartmentalized in concept, stored in museums as specimens in their "segregation from common life" (Dewey, 1934, p.9). Dewey (1934) implies that there is now felt to be a gulf between ordinary and aesthetic experience, when once they were integrated, the aesthetic is now rather more implicit than explicit in normal everyday life and culture. This is a situation commonly rectified by the
inclusion of art in people's lives, through study, visiting museums and galleries, or appreciation of artworks and artistic manifestations in the world around them. Learning may occur at any age, and in many forms, enabling people to develop a deeper awareness of, and involvement in, the world around them. It provides them with the opportunity to experience the joy of creation of a personal interpretation of that awareness. This is an avenue followed by many in the current era of 'lifelong learning' (Bramlett, Gueldner, and Bennett, 1994; Courtnay and Truluck, 1997). All art forms express their creator's involvement in their life, and their particular culture, no matter what the level of competence in its production. "Imagination…is a way of seeing and feeling things as they compose an integral whole…where the mind comes in contact with the world" (Dewey, 1934, p.266). The artistic creative process expressed by individuals reflects the culture heritage to which it belongs.

Stones (1966) considered that “cultural change has replaced evolutionary change,” because evolutionary change in brain structure has been superseded by the human brain developing in a more complex environment (Stones, 1966, p. 31). A related theory relevant to a consideration of the cultural motivation to create, and which serves to explain the way in which culture might be inherited, is the concept of the ‘meme,’ developed by Dawkins (1989). Meme is a term used to explain a self-replicating entity that fashions culture. In this way knowledge absorbed by the culture emerges again and again, such as in the work of art movements whose major elements are revisited from generation to generation. Similar to genes, which carry organic knowledge, memes carry "anything that is copied from person to person by imitation" (Morton, 2000). According to Dawkins (1989) memes are a driving force in human evolution. Viewing the person as a society of memes, this theory visualizes no central place in our brains for sorting information. Instead there is a network of interacting memes balancing and rebalancing in a parallel system, projecting outwardly as the conscious self (Morton, 2000a).

Earlier views of various societies of the world place the human mind and thought processes within the cosmos, as an infinitesimal, functional part of the whole of creation (Highwater, 1981; Palmer, 1998). Perhaps the theory of memes is a form of recognition that western philosophers are finally traveling full circle, returning to a base in nature, in their move away from a mechanistic outlook on life. Artists are influenced
by culture because reaction to culture provides a motivation to act creatively, but they are also closely involved with and inspired by the natural world.

TEACHING ARTISTIC CREATIVE PROCESS

The value of teaching in the area of artistic creative process is discussed most fully by Dewey (1934), who connects the experience of art making to the development of a variety of personal and cultural attributes. For example, thinking processes connected with the emotions, with a sense of purpose, and a moral outlook may be considered (Dewey, 1934). All of these are life skills, linking art with life experience and natural human life processes. In this way, the richness of knowledge acquired through a lifetime of learning experiences relates to the artistic creative process. The associated concept, 'Lifelong learning' has become a recognized form of institutional and non-institutional educational provision, offering learning situations to people of all ages in a non-academic arena (Bramlett et al., 1994; Courtnay and Truluck, 1997).

Connecting with the conclusion made above, that all experience adds to an individual's store of knowledge, a particularly relevant teaching model for the creative process may be that of Kolb (1984). This model offers a method of ‘Experiential Learning,’ offering a framework that links the classroom with the wider world. In this model learning is seen as a lifelong process, based on the tradition of learning by experience as found in the apprenticeship situation, in laboratory studies, and in studio arts. In this method of teaching and learning, the 'whole person' and their life experiences are taken into account. Artistic creative process education fits well under this umbrella.

The creative process is an important component in many educational situations, as it plays a vital role in many disciplines, recognized particularly in the area of 'problem solving.' An educational adaptation of creative process is the use of ‘problem-solving’ activities in the classroom (Torrance and Myers, 1972; Torrance and Safter, 1990). Torrance and Myers (1972) propose many such teaching strategies based on self-motivating learning experiences (Costa and Liebmann, 1997).

As discussed above, the creative process is one that is available to all humanity, as a function of everyday living, although a recent fashion in educational literature and practice has been to focus discussion on the creative process around the 'gifted and talented,' a selected group of students (Mumford, 1998)
That creative process may be taught through art is supported by the work of Wright (1990), Perkins (1981), and Dewey (1934) in the educational field, and Zeki (1998) in physiological aesthetics. Wright (1990) supports teaching the creative process in art through a fundamental approach to learning and describes the creative act as holistic, blending concept, feeling, analysis and intuition. In fact he argues that creativity is “the essence of true learning" (Wright, 1990, p.52). Wright emphasizes that there is a need to understand the creative process in order to better teach it, and that in art teaching students should "be taught meaningful content and functional skills" (Wright, 1990, p.56). Wright (1990) suggests the use of a structured curriculum that offers skills, and he advocates giving students appropriate time and nurturing to develop a substantial understanding of meaning in art education. The need for learning basic skills is evidence of an acknowledged need for a prepared mind (Perkins, 1981; Wright, 1990).

Mumford (1998) in his model of the development of creativity suggests experiential learning as a later stage in the learning cycle, preferring to first develop 'base concepts,' along with information-gathering, and evaluation skills, before encouraging independent development of new ideas.

SUMMARY

The literature indicates that the creative process is a natural function, and that it is a naturally occurring phenomenon, which consists of the following consecutive stages or elements:

- immersion in an acquisition of knowledge
- incubation of thoughts and ideas leading to insights, discoveries
- concrete expression, or interpretation of discoveries
- evaluation and sharing of results

Figure 1 - A single cycle of the creative process may be represented as follows in a linear view:
Immersion is a process of acquiring information around a topic; incubation involves processing that information, whilst interpretation consists of expressing new understanding that may be shared with others. In a simple assessment of the creative process it would appear to be a function of human acquisition and dissemination of knowledge, a natural human method of information processing (Piaget, 1971).

Further, the literature would suggest that the creative process of art making involves the following elements, which may be understood to overlap in their activities in the exploration of creative heuristics. The senses, represented by visual perception in the case of visual art, plus conceptual skills, when added to interpretative skills lead to discovery of meaning through art making.

![Figure 2 - Functional Skills Involved in Visual Creative Heuristics](image)

Also, there is literature that would suggest that the mental state of deep concentration facilitates the freedom of activity by the mind to reach those areas that make connections with previously acquired knowledge and experience (Austin, 1998; Rugg, 1963; Stein, 1974). This access leads to the development of creative thoughts, ideas, and actions.

The encouragement of creative thinking and problem solving in education is evidence of the status that these cognitive skills have acquired (Gordon, 1961; Torrance and Myers, 1972; Torrance and Safter, 1990). A deeper understanding of the artistic
creative process adds further dimensions to this already developed area of education by extending understanding of the source of this natural life-relevant activity.

The observations made so far summarize the more traditional writings that portray the creative process. Yet, through rethinking, or reflecting on the elements of creative process, a recasting of its features provides a more thought provoking alternative - or complementary – perspective. The major contender here is Chaos Theory.

Such understanding may be examined through Chaos Theory as it offers a rich and diverse, but ordered, view of life’s processes that serves to enhance links with nature and the natural creative process, for artists and scientists alike. Understanding of natural order may improve understanding of the nature of the artistic creative process by elucidating the functions of the interlocking and interacting activities that are involved in the creative process. Thus we would be directed to a less linear view, one that may fit better with the actual individual experience of art making. Thus, too, it may be possible to do this by exploring more closely the creative process links with nature, more particularly our own human nature, and the related meaning that is to be found through art making.

In exploring the main elements of artistic creative process the question arises, how do the activities of immersion, incubation, illumination, and interpretation interact with visual perception, conceptual skills, and technical ability in interpretation, so creating an environment whereby creative heuristics may flourish? The other contributing influences discussed above, those of emotion, motivation, culture and Nature should also take their place in an interactive explanation of the artistic creative process, as they are strongly influential elements. The whole appears an incredibly complex activity, disordered, with components that are interactive and interdependent but infinitely variable. So we now have all these component parts, how do they work together? How may their interactive dynamics be understood?
Hence, a linear explanation does not seem able to account for such interaction, because the component parts are not separated in activity. They need to be interpreted as interactive and interdependent, and this is where Chaos Theory concepts aid interpretation of the process.
CHAPTER TWO
CHAOS THEORY LITERATURE REVIEW

The initial aim of this study was to explore how the artistic creative process works, and to isolate elements that relate to art making in order to facilitate understanding of the art teaching process. The result of the creative process literature review was to discover that it offers generalizations about stages of the process, but is less informative about the interrelated mechanics of the way the process actually works. Also there is an inherent problem, in that seemingly simple questions such as, why does the creative process exist, how does it work, and why do we need to encourage it, all have the potential to balloon into unmanageable areas of study. There seem to be too many variables to comprehend, especially when considering the possibility of successfully teaching art to many individuals in a classroom at once, especially when they are all deemed to be functioning differently from one another due to their varying individual life experiences.

A linear approach to such a situation, resulting from the mechanical Newtonian paradigm, and emphasizing ‘anticipation’ and ‘predictability,’ and ‘outcomes,’ has limitations that force a structure based on cause and effect, a limited deterministic path to follow in attempting to understand complex phenomena. The knowledge gained in a linear way tends to dismiss a large amount of material as being unimportant, or having no place in the analysis. However, on consideration, this material is found to reveal hidden structure and behaviour when incorporated into a non-linear form of analysis or synthesis. A non-linear approach appears intuitively more suitable to discussion of the artistic creative process of visual art making and there are clear indications of a growing interest in such innovation. This chapter explores one major contender for the role of best heuristic for understanding the artistic creative process, that is, Chaos theory.

The theories of complex dynamics eliminate the dualism found in mechanistic theories of the early 20th century that encouraged separation of disciplines. Therefore, in searching for a way of explaining how the creative process works, Systems Theory initially seemed the most appropriate answer, having been previously utilized by King (1979) and Csikszentmihalyi (1988) in relation to the creative process and art. King (1979) used Systems Theory in his thesis discussing creative process in visual art, to give form to his understanding of the creative process. The systems approach is
consistent with an image of a systemic, holistic, evolution directed path to change, relevant for the creative process associated with visual art. King (1979) viewed the artistic creative process as a system whose interconnected components are in dynamic states. They are defined by description of the dynamics that vary according to the phases of activity. It is a view of a holistic system wherein the whole is more than the sum of its individual parts, due to interaction and interconnectedness of the parts creating something new together.

Csikszentmihalyi (1988) developed a systems approach to creativity that is based on the interrelations of three systems that join to form a creative idea. His 'dynamic model' illustrates the relationship of the three main systems of person, field, and domain. Resembling the concept of cultural dominance suggested by Dawkins (1989) and Stones (1966) as discussed on page 27. It "represents a cycle in the process of cultural evolution" involved in an ascending spiral reaching towards the next generation of people (Csikszentmihalyi, 1988, p.329). He describes it in this way, that the individual takes information provided by their culture, transforms it, and if the result is seen to be valuable by society, then it is passed on to others. This theory takes account of the evolutionary part played by creativity in society, and the complex context surrounding a creative individual. These examples offer very valid and contemporary models for the creative process, but Chaos Theory offers more, with its holistic, open-ended, autopoietic dynamics. It appears to well encapsulate artistic creative process and its non-linear dynamic complexity. It incorporates change and growth, providing the dynamic structure for a holistic view whilst still allowing the whole product to become more than the sum of its individual parts (Arnheim, 1969, 1996; King, 1979).

Chaos Theory, or to use Hayles’s nomenclature, ‘chaotics,’ is broad in application, and its diversity of application is fast becoming recognized. Its strength for the humanities is perhaps a cultural one, and lies in the fact that the "common theme running through this diversity, is that science and literature are not above or apart from their culture, but embedded within it" (Hayles, 1991, p.30).

In the exciting developments of the new sciences the theories that have developed from the physics of dynamics are being hailed as providing concepts with major implications for all disciplines (Hayles, 1991). Hayles (1991) refers to Chaos theory as being "part of a paradigm shift of remarkable scope and significance" with its ability to reveal the web-like connections between all systems (Hayles, 1991, p.2). It
deals with change, irregularity and unpredictability, in the turbulence of life itself. Chaos Theory is relevant to nonlinear systems that are all around us, in the movement of wind, water and the air, in the dynamics underlying human social culture itself, in the structure of language, customs and beliefs (Hayles, 1991). Perhaps more surprising, geometric order is still present in this nonlinear order, and stable patterns appear to be the basis of the natural process of change (Briggs and Peat, 1989).

Chaos Theory also provides a non-linear structure for a research study, with an emphasis on synthesis rather than linear analysis. It recognizes the importance of absorbing all available material, with the understanding that all influences, down to the smallest, microscopic snippets of information, are vital, because they have the potential to influence change to a large degree (Hayles, 1991).

Chaos Theory has developed from research in the area of non-linear dynamics, initially from thermodynamics, the science of energy flow. Physicists were seeking a form of order in apparently impossibly disordered systems. As a developing science, it is involved in exploring dynamical systems, referred to as chaotic in nature. The name Chaos, representing disorder and lack of harmony, has become a misleading one, as scientists are finding that in exploring chaotic systems they have "discovered a deep, underlying order to nature's ways" (Allman, 1993, p.84). Chaos Theory is an all-encompassing theory, providing an ordered way of thinking about complex phenomena. There appear to be two branches of Chaos Theory, one which is based on the concept of order emerging from chaos, and the other that is concerned with the order hidden within complex systems (Gleick, 1987; Prigogine and Stengers, 1984). The artistic creative process may be appropriately associated with either of these directions.

In reflecting on the development of Chaos Theory, Hayles (1991) compares it with other Postmodern theories such as Poststructuralism. The comparison arises in that it is a new way to think about order as a "replication of symmetries," also incorporating unpredictability, and asymmetry (Hayles, 1991). She also makes the point that Chaos Theory is more general than Quantum Mechanics because it emphasizes the importance of random events at every level, "from the molecular to the global" (Hayles, 1991, p.12). Chaos Theory regards the ambiguity of opposites as normal, and as providing an intuitive view of the world. Hayles (1991) concludes that the cultural matrix as a whole is the source of the parallels to be found in current critical theory.
Use of Chaos theory has extended beyond physics into other sciences, such as psychology, physiology, and neurology, and into literature, social science, and the humanities (Abraham and Gilgen, 1995; Allman, 1993; Hayles, 1991). For example, in relation to neurology, Peak and Frame (1994) refer to studies made using electroencephalographic (ECG) data in analysis of brain rhythms, and these studies have shown that Chaos may be the tool the brain uses to:

- allow itself the flexibility to analyze and assimilate new data;
- to engage in problem solving by trial and error;
- and to generate insight and make creative, intuitive leaps (Peak and Frame, 1994, p.364).

Bolland and Atherton (1999) find the mathematical approach of Chaos Theory eminently suited to their research in the field of social work. "Like inferential statistics, to which they are first cousins, fractal geometry and nonlinear maths can indicate the limits for a range of outcomes that are more complex than the simple outcomes of linear reasoning" (Bolland and Atherton, 1999, p.4). They state that there is no distinctive practical model, or steps to take, provided by Chaos Theory, but that it can transform understanding, thereby giving form. One of the most important points they make is that Chaos Theory supports the provisional acceptance of truth as subject to revision as new knowledge emerges. The world is not "regular, predictable, controllable and completely knowable" (Bolland and Atherton, 1999, p.6). This implies that interpretation is always provisional, with a developing understanding rather than prediction as the goal in research that uses Chaos Theory as a basis for discovery of hermeneutics.

In a different discipline, Goodwin (1997), after a career in medicine spanning thirty years, finds that Chaos theory provides validity for his students in studying unpredictable complex systems. In providing ways of analyzing complex systems without the expectation of finite understanding, he feels that students are able to concentrate on the medical process, treating symptoms properly rather than urgently seeking answers that may not be there. Again, the emphasis is on process rather than product.

Weissert (1991) explains that Chaos Theory helps him to visualize the nonlinear complex dynamics of culture as an interactive fluid system, each of the disciplines supplying a current of information. He describes this system as one wherein each discipline processes information in its own way, then adds it to the general flow, where ideas interact with and influence one another.
Goerner (1995), involved principally in psychology, regards the broader revolution attained by the new science to be the realization of interdependence at all levels, from molecules to society. Her view is that science is developing an understanding of the physical organization of change and "factors underlying transformations," and it has "profound empirical, philosophical, and metaphysical implications for psychology" (Goerner, 1995, p.3). She states that Chaos Theory provides empirical tools and concepts, a metaphysically new sense of man's connection with the universe, and a future view. The world's current complexity of global interaction leaves us with a need for an integrated view of the future. Theories resulting from the use of the new tools provided by Chaos Theory are, for example, dynamic systems theory, neural nets, self-organization theory, and fractals. However, Goerner (1995) considers Chaos's most important finding to relate to structuring, that interdependence produces patterns, coherence, self-organization, networks, and synchronization. This explains how and why systems structure themselves, how they arise and change. Goerner (1995) describes a holistic order in Chaos caused by interdependent variables pulling and pushing each other, in chains, in circles, and networks, all in the immediate moment.

Chaos Theory is regarded as a profound revolution in thinking, with far reaching significance. It contains universal elements of understanding, applicable to all previously separated study disciplines, sometimes divided among themselves due to problems caused by the inability of analytical reduction to answer their non-linear questions. Abraham (1995) summarizes the appropriateness of the use of complex dynamics, in the field of psychology in particular, by suggesting that the common language of the theory would serve to balance and unify the diversity within the field. He considers that, "it is easily mastered, it is clear and simple, it can be pursued to more sophisticated levels, or remain as a metaphoric clarification of ideas," (Abraham and Gilgen, 1995, p.47). Abraham also considered it to be an avenue that would enable psychologists "to heal some of the schisms between analytic and holistic approaches," (Abraham and Gilgen, 1995, p.47).

Goerner (1995) also writes of healing schisms through Chaos Theory, by bringing opposing theories together, such as learning and developmental theories, so that opposition may become complementary rather than antagonistic. Once the main premise of each opposing view is expanded it is often shown to be in accord with all the
others. Goerner (1995) offers a clear summary of how Chaos Theory has become part of the revolution in thought. This is based on "discovering the importance of interdependence in shaping the world at all levels, from the molecular to the societal," with energy flow as the key to explaining evolution (Goerner, 1995, p.3). She explains Chaos Theory as an umbrella term for various approaches that may be used to explore non-linear interdependent systems. The "tools, methods and models" associated with Chaos Theory have provided a set of theories such as "dynamical systems theory, neural nets, self-organization theory, and fractals" (Goerner, 1995, p.3). Hidden non-linear patterns are revealed through Chaos Theory that are not seen using linear analysis. This is because Chaos Theory incorporates the elements which linear analysis rejects as irrelevant, or error related. It also encompasses all previously analysed linear systems by including them in an interdependent whole, giving a broader sense of the world structure.

The theory that we live in an interacting ecological universe, self-ordering, driven by energy flow, and built by non-linear dynamics, is well supported. Evolution is seen as reliant on co-operation, co-ordination, an interwoven interconnectedness, wherein "everything affects everything, eventually," (Goerner, 1995, p.14). The artistic creative process is also an evolutionary process, consisting of interwoven, interconnecting, and interactive components.

The following paragraphs summarize simply some basic terms and concepts of Chaos Theory, seen through the eyes of a visual artist and teacher seeking order in working with the artistic creative process. The terminology and its meanings provide strong metaphorical basis for understanding and discussing the creative process, and for clarification of ideas connected with its dynamics. These elements are inevitably, all interrelated, in particular:

- Non-linearity
- Sensitive dependence on Initial Conditions
- Iteration and Recursion
- Irreversibility
- Bifurcation
- Attractors
- Phase Space
- Fractals and Scale
Web-like Connections Between All Systems

Interdependence

Autopoiesis: Self-Organization

Entropy: Dissipative Structures

Non-linearity

This primarily means that the relationship between two things is not always proportional. Nonlinear aspects reveal hidden behaviors either not found by linear analysis, or discounted as error. There is a geometric order in nonlinear interdependent complexity whereby mutually affecting variables form ordered patterns, or even pattern of patterns, in patterns of order. Each stage is the foundation for the next, in a cycle of activity.

From a modern scientific point of view, the value of studying variability in complex systems is that instead of throwing away information labelled 'noise' as excess to requirements, it is considered to provide valuable information (Smith, 1995). Also, the existence of multitudinous variables implies a dynamic freedom of direction. This situation is to be found in the turbulent energy of the motion of waterfalls or cloud formations. It is understood to be similar to the chaos of perceptions received and processed by the brain.

Sensitive Dependence on Initial Conditions

Sensitive dependence on initial conditions is one of the main tenets of chaos theory. It points to the impossibility of reaching precise real measurement of any natural physical, biological, or social phenomenon, except in theory, as there is always a little uncertainty, and the very smallest measurement of uncertainty affects results. This is why weather prediction was always such a problem, because a slight alteration in one place in the world would amount to an enormous change elsewhere (Gleick, 1987). The classic example of the butterfly effect is well known. It states that a small action in one place, such as the flutter of the butterfly's wings will cause a world-shattering occurrence elsewhere (Abraham and Gilgen, 1995; Hayles, 1991; Peak and Frame, 1994; Prigogine and Stengers, 1984).
Iteration and Recursion

Sensitive dependence on initial conditions governs the important elements of iteration and recursion, whereby destabilization of a system may occur, leading to unanticipated developments, and change. In Chaos Theory, original ideas result from repetition, from revisiting problems, information, or knowledge. Each revisit will be different from the last simply because it is happening at a different time, when the smallest change in circumstances will have occurred, enough to cause an effect and the resultant new conclusions. Because initial specifications of a problem are never totally precise, then there is always an expectation of unpredictable results (Peak and Frame, 1994). Feedback, circular causality, and self-recursivity are terms also associated with iteration and recursion (Goerner, 1995)

Irreversibility/Path Dependence

Because any input, however small, will greatly affect the outcome of an activity, prediction is unlikely, and the action, or the path that is followed is irreversible. In this way, the concept of path dependence incorporates that of sensitive dependence on initial conditions, which initiates the path followed. It is a unique path, prohibiting return.

Bifurcation

This is an essential concept in the development of nonlinear order, whereby a smallest change affects the energy level, swelled by iteration to such a size that it divides, and a fork is created offering different paths to follow. A new pattern then forms. If a system continues to bifurcate too rapidly then a chaotic situation may occur and order may be lost. If, however, feedback loops form, then the situation stabilizes, creating a new stage in the behavior of the system, and so the process begins its journey towards change again (Briggs and Peat, 1989).

Energy flow is tied to the growth of systems. When the force of a flow is structured it moves energy faster, and any resistance may lead to a crisis resulting in bifurcation, in change to make the system more efficient. Perhaps new forms occur, large forms become many smaller ones, or joining of previously independent systems occurs. In this way "Massive pressure creates a cycle of evolution…(in)...an energy vision of evolution" (Goerner, 1995, p.12).
Attractors

The theory of attractors is basic to the organization of dynamical systems and their self-organizational structure (Hayles, 1991; Peak and Frame, 1994). An attractor consists of a focal point, acting like a magnet drawing material towards it. There are many types and forms of attractor, those of fixed points, those following a limited cyclic path, and those that are multidimensional. All serve to explain irregular actions, from the simple pendulum to the turbulence of water in motion. Where large swirls of water break up into smaller ones, bifurcation occurs, and new forms are born, with the smaller swirls forming around new attractors (Briggs and Peat, 1989). In this way, nonlinear processes build on themselves causing change from within. The term ‘strange attractors’ refers to irregular patterns of movement, bouncing around chaotically following an attractor, as in the action of turbulence.

Phase Space

Phase space is the space within which the activity around an attractor takes place, and relates to the range of possibilities involved in the activities of elements moving in relation to a particular type of attractor.

Fractals and Scale

Chaos Theory incorporates the problem of scale, from atoms to galaxies. This is an area where the advent of computers has hastened the study of chaotic forms. Computers enable illustration of complex iteration by incredible visual diagrams. Repeated similar applications of a geometric shape may result in a regular pattern, reminiscent of those found in nature, for example, the self-similar fractal patterns as seen in snowflakes, or those found in ferns. Created mathematically on a computer such patterns are ‘perfect’ fractal forms, wherein the parts mimic the whole, transformed only by scale. For example, the Mandelbrot set, named after Benoit Mandelbrot, is a composite pattern of recurrent fractal shapes. It proceeds to infinity by repeating its form. Similarly, in patterns of ferns in nature, the parts are reminiscent of the whole, not identical, but self-similar (Peak and Frame, 1994).
Irregular pattern was found to have order that was "a new kind of qualitative scale based measure - the fractal dimension" (Briggs and Peat, 1989). Feigenbaum considered scale to be a clue to understanding the process of evolution (Gleick, 1987).

**Web-Like Connections Between All Systems**

Goerner describes a whole as a "self-organizing interdependent web" (Goerner, 1995, p.14). Such a web may be envisioned by considering a person in relation to their environment. A recursive feedback loop is established when a person adapts "new knowledge from his or her environment to match his or her personal meanings"(Warren, Franklin, and Streeter, 1998, p.6). In doing so they change the environment, this in turn influences them, and so on. Deterministic chaotic behavior arises within feedback systems, never precisely repeating, and yet staying within system limitations. Therefore, as a living system a person may be understood to be an expression of their structural connections. This is known as structural determinism (Warren et al., 1998, p5).

Sub-systems interact with one another to form a larger working system within the constraints of the sub-systems, so that the whole system moves and grows as one. The creative process works in this way, with all recognized stages interacting to form the whole. Interaction between members of groups may also be understood in this way, with group process based on connections between members (Warren et al., 1998)

Self-sustaining cycles form in this way, reproducing and thus creating widespread networks. There is a structural efficiency in self-sustaining cycles that reproduce themselves forming networks. In the interwoven wholeness of the ecosystem, evolution is reliant on such co-operation, co-ordination, and interconnectedness (Goerner, 1995, p.14). An efficient process depends on its structure.

**Interdependence**

Interdependence is found at all levels and between all levels (Goerner, 1995). Interdependence can be:

1 - Instantaneous, x + y affect each other,
2 - Circular, x affects y which affects x,
3 - Self-reflexive, x affects itself,
4 - Networked, where x, y and z have complex interrelationships.
Interdependent variables pull and push each other until they form holistic order. Interdependence relates to the concepts of feedback, circular causality, recursion, self-reflexivity caused through interaction between parts.

**Autopoiesis: Self-Organization**

Self-organization is a concept that plays a substantial part in systems theory. It serves to explain how dynamical systems function autonomously and has been considered for many years to be an explanation for psychophysical activity and growth (Hayles, 1991). The general emphasis of gestalt theory on autonomous order formation makes it an important forerunner of the theory of self-organization in dynamical systems. An early psychological formulation of self-organizing theory is to be found in the work of Wolfgang Kohler (1940). In his psychophysical ‘field theory’ of cognitive processes and brain function cognitive systems were to be seen as self-organizing systems, providing a theory of perception in a gestalt framework. Perception is seen to be a process that creates autonomous order. In this theory external perceptual stimuli perform a boundary function of domain creation. Kohler (1940) suggested that the concept of self-organization could apply to microscopic and macroscopic behaviour alike, thus solving the problem of non-linear systems where linear reduction analysis was not found to be appropriate. At the time Kohler was writing, the idea of a non-deterministic system was extremely innovative. Kohler described complex structures in physical systems that originate 'spontaneously' from the system's inner dynamics. He was not influenced by linear thermodynamics, which tended to look towards a final equilibrium as a basic principle of self-organization. Kohler thought this unsuitable for biology because it anticipated an end result, which only applies to a closed system, and an organism is not a closed system (Krohn, Kuppers, and Nowotny, 1990).

In self-organizing theory, systems are characterized by a continuous, if irregular, energy flow that causes inner-systemic fluctuations. During these fluctuations a system may be brought into an entirely new state of order by means of self-amplifications, referred to variously as autocatalysis, a cycle of iterations, or feedback loops. Usually the system passes through a chaotic phase of instability and reaches one of two or more possible stable states and so on (Krohn et al., 1990).

This is perhaps one of the most important concepts used in Chaos Theory, particularly when considering human mental life. Ellis and Newton (2000) describe
self-organizing structures as dynamical “systems that exchange energy and constituent materials with their environment, yet are organized so as to maintain continuity in their tendency to settle into complex but homeostatic patterns of activity called ‘attractors’ or ‘basins of attraction.’ Biological organisms are the prime examples of such complex but stable systems. The identity of the organism is constituted by the continuity of its pattern of activity, not by a continuity of specific material components” (Ellis and Newton, 2000, p.3).

The concept of autopoiesis was developed from observation of the structural integrity found in biological forms. They are found to structurally maintain themselves even though their component parts may undergo constant change (Maturana and Varela, 1980). Autopoiesis is therefore a concept referring to the self-maintenance of a form and its structural integrity, whereby the structure of an element may be maintained while its components experience change (Pribram, 1995).

Paulson (1991) describes self-organization from ‘noise,’ or a mass of surrounding information, as a process that deals with the ambiguity supplied in the massive information input that is our environment, thereby creating order from chaos. “It is the presence of noise that forces a system to reorganize itself at a higher level of complexity” (Hayles, 1991, p.20). The ambiguity of opposites reflects a normal balance of elements and provides an intuitive view of the world ‘the forced blending of components that are incompatible is precisely what gives rise to phenomenal consciousness’ and ‘novelties emerge from incompatibilities’ (Newton, 2001). Read (1964b) commented in a similar vein in relation to art:

Art, like the human mind itself, embraces contradictions; it is the balance of these contradictions that produces the high degree of tension necessary for the production of the greatest works of art (Read, 1964b, p.125).

The systems theory explanation of self-organization is based on thermodynamics, the science of energy flow. If there is a large concentration of energy, a build up in field pressure is created, leading to flow. Energy flow is tied to the growth of order in complexity as "energy always seeks to flow as fast as possible and structured flow moves energy faster" becoming a force (Goerner, 1995, p.12). Resistance blocks the pressure, which may go even faster, or reach a crisis, a bifurcation, so that change occurs and the system becomes more efficient. New forms are created, large forms become many smaller ones, or coupling of previously independent systems occurs.
Therefore, "massive pressure creates a cycle of evolution" as each stage is a foundation for the next. The pattern of this activity has the character of "punctuated equilibrium" (Goerner, 1995, p.12). Abraham (1995) considers self-organization to be the most important element of dynamics for psychology because all living systems are self-organized, in charge of their own:

control parameters, giving them the capability to make bifurcations within their own dynamical schemes and complex dynamical systems. Sentient beings can thus learn their own response diagrams, so to speak, can learn to navigate them, and can imagine extrapolations of those diagrams and test a new universe of self (Abraham, 1995, p.47).

Goerner (1995) writes of the importance of developing self-maintaining dynamics, the autopoietic aspects of a system. Dynamical systems may be simple or complex, although a complex dynamical system is one that can be subdivided into simpler components. Similarly, in a complex network one component is under the influence of all other component parts, perhaps not directly, but via a chain of other components forming a feedback loop (Abraham, 1995).

Entropy: Dissipative Structures

Non-linear, self-organizing systems of the human living organism, such as the creative process, are open systems, and that enables them to exchange energy and materials with their environment. They are not static structures but strong systems retaining an autopoietic identity in a state that is far from equilibrium. Through the process leading to bifurcation change occurs, and new structural combinations are created. In an irreversible process, these systems tend to be dissipative; losing energy in performing an activity whereby any disturbance to the pattern of the process may be destroyed by the strength of the motivating force of the pattern (Prigogine and Stengers, 1984). Dissipative systems lose energy over time. It is an irreversible activity whereby new energy is absorbed from the environment and accumulated entropic fallout is expelled back into the environment. This process has survival value because it allows for quick change that leads to evolution (Warren et al., 1998). It is a healthy process, as dissipation clears disturbances and provides stability and strength (Arnheim, 1971; Davies, 1987).
SUMMARY

This brief summary of the main elements and dynamics of Chaos Theory serves to introduce some of the tools of a holistic approach to understanding non-linear phenomena. An exploration of the adaptation of these tools in the study of artistic creative process seems appropriate.

The creative process is best understood from a holistic point of view because the elements that affect the development of creative process are extremely complex in their dynamics; they are interactive, and open-ended in direction (Palmer, 1998; Costa and Liebmann, 1997; Richards, 1996). An explanation of how the creative process works is elucidated by Chaos Theory that covers all aspects of the process, which may be described as a system consisting of sub-systems, the interrelated stages, each composed of an individual and complex natural order (Urban, 1995). Simply related in a description of how the process works, the component parts of the creative process may be understood to perform in a single cycle that relates to the chaotic process as follows:

Figure 4 - A Single Cycle of the Creative Process – a Chaotic Linear View

However, as discussed above, the process is not linear in its activity, therefore a better diagrammatic description may be one that illustrates interrelationships of elements:
The iterations may be described as becoming more and more interrelated and interacting as the process progresses:

The possible iterations are numberless, and the pathways taken during a creative process would vary from person to person according to their individual ontogeny.
Chaos Theory provides a system framework offering holistic understanding of the constantly evolving interrelationships between components of the creative process. A theory that is nonlinear and open-ended, it encompasses the constant change experienced in the creative process within all its possible contextual influences. The structure of Chaos Theory provides a more comprehensive and open means of understanding than that provided by a deterministic linear framework, which would anticipate an explanation exhibiting finite cause and effect. Chaos Theory therefore offers a suitable framework for understanding the interrelationships found existing within the artistic creative process. It is also important to link these activities with the dynamics found in an educational environment, where growth and change of knowledge and understanding are attributes that provide the basis of teaching and learning.

Indeed, thinkers in this field have already begun to delineate and chart the connections between Chaos Theory and the artistic creative process. Therefore a discussion of such connections follows.
CHAPTER THREE
CONNECTIONS: CREATIVE PROCESS
AND CHAOS THEORY

*I say to you: one must have chaos in oneself in order to give birth to a dancing star.*

Friedrich Wilhelm Nietzsche (1844-1900)

Eisner (1985) considers that the main motivation for art making is founded on the fact that humans feel the need to explore and give meaning to the world through finding order. As discussed previously, in so doing they hope to create a balanced, harmonious existence, that is, to overcome and reduce the tension in life by discovering homeostatic order, constancy. But, because change is an ever-present facet of existence, then the process is a continuous one. No sooner is a conclusion reached than it is reconsidered in relation to new occurrences, and a fresh assessment is required, with a new end in view. It is a continuous search for constants, for homeostasis. This is reflected in the fact that in the life of a working artist, when one piece of artwork is completed another soon takes its place (Arnheim, 1971).

Inevitably, artists also have a deep interest in exploring the essential elements of existence, in seeking the essential order that Chaos theory describes.

**Nature, Artists, and Essential Meaning**

Artists have always had contact with nature and the natural processes. They seek knowledge and meaning relating to their relationship with nature through creative art processes. Vazquez holds the view that the artist is involved in a search for essential reality (Vazquez in Werhane, 1984). This view is endorsed by Klee, who refers to his own search for the "seen and felt essences of nature" (Klee, 1925, p.12). Picasso also speaks of searching for the "essence of reality" (Barnes, 1992, p.68). The painter Dobell (1900-1970), in conversation with Freeman, spoke of "the essence of the person, that's what I'm after," when considering his portrait painting (Freeman, 1970, p.80).

Australian painter John Wolseley talked to interviewer Janet Hawley (1993) of working within an understanding of his own creative processes and their relationship with the essences of Nature. After spending a week alone in the Australian bush, he
describes how he had been collecting visual sensual information, such as the shape of rocks, bird song, spiders' silk. He experiences “a state of reverie” on these occasions; then the natural sense of place seems to take him over. He feels that in studying nature ‘up close’ he becomes part of the landscape, and needs a regular link with nature to renew his identity. Wolseley likes to “immerse myself in it; become transformed by it, slow down to its time, so I'm part of the one great symphony” (Hawley, 1993, p. 140). This relationship of human and environment is so closely interconnected that it may be understood that at such a time we are the environment, living in a world of our own making that identifies with the world around us (Montuori, 1992; Montuori and Purser, 1995; Richards, 1996).

Read (1964b) comments on this topic:

Art is grace, art is form, art is – among all possible manners of doing or making a thing – the most memorable. That particular manner of doing or making a thing is memorable because it stimulates our senses, because it brings human inventions within measurable distance of organic growth, because for a moment the will of man seems to be identified with the universal forces of life (Read, 1964b, p. 176).

Each artwork produced in relation to such a situation represents experience of months or years of investigation, of living, of looking and absorbing, of feeling at one with the environment. The state of mind that Wolseley describes is similar to that referred to by Polanyi as indwelling, an embodied experience of participating in the existence of something other than our own, except that it is an awareness of oneself within the environment as part of a wholeness (Polanyi, 1969). This is a form of tacit knowing that may reach consciousness after a period of reflection, to be interpreted by an artist in terms of an artistic medium, as Wolseley does so well (Grishin, 1998). Or the artist may be so involved that there is no conscious awareness of the work in progress (Erickson, 1969).

Whitely also referred to working in a state of ‘reverie,’ saying that “the moment you know what you're doing its just illustration, not art” (Hawley, 1993, p.42). Nolan described his art making:

You almost do it in a trance. You don’t make any mistakes; if you want to paint a horse, you paint a horse. I work hard physically and mentally, lose weight, I love doing it. I’ll keep painting for ten hours or longer. You get into
a kind of abstracted state that you do not want to interrupt, so keep on going. As long as you don’t make any mistakes - they slow you up. But when you get that run it’s a wonderful feeling, out the pictures come (Hawley, 1993, p.174).

From these examples it may be seen that in the process of creative art making experienced artists work in a state of mind that is akin to a type of meditation (Austin, 1998). They work in a state of suspense, when a feeling of freedom and connectedness allows a flow of thought to occur between all levels of consciousness (Csikszentmihalyi, 1990; Ghiselin, 1952).

Laverne (1996) in writing of her own creative experiences as a musician, also feels that during the creative process aspects of the mind merge, and there is for her also a sense of the human living system functioning to the highest level of natural existence. Wolseley describes this experience as feeling “part of the great symphony” of life (Hawley, 1993, p.140). Perhaps this overwhelming sense of oneness with nature is a state of mind in which connections link at the deepest level of brain activity, networks joining and lighting up like Christmas lights, and perhaps the time taken over incubation reflects the depth of connective activity involved in the process. This image of brain activity relates well to the description of 'sudden illumination' used by some to describe the feeling of seemingly spontaneous understanding which is the conscious experience often associated with new creative ideas (Bachman, 1994; Rodriguez-Fernandez, 1996). It is certainly self-organization on a grand scale that is reflected in a deep sense of personal identity at this time (Csikszentmihalyi, 1978; Hart, 1998). It is an experience so intense that it may be considered to be a form of spirituality, indicating a particular type of bond between art and religion (Austin, 1998, 1999; Coleman, 1998).

The concrete active construction of art making reflects a momentary reality, a reflection of a passing perception (Kohler, 1940; Lewin, 1993). It may be considered that interaction with our environment causes us to build a reality according to our current state of mind and contextual influences, which is reflected in our art making (Werhane, 1984). Practising professional artists appreciate this, for example, Tim Storrier, in conversation with journalist Janet Hawley, showed great depth of feeling, in touch with his personal reality, when he said,

What I paint has meaning, I think about it deeply, incessantly, it is me. A painting is really a graphic illustration of where a particular artist is at that point in his life. It's his creative struggle to understand it - though no artist
ever utterly understands what he is doing. Other people come along and interpret the paintings, from their own life’s experiences (Hawley, 1993, p.155).

Klee (1925) was intensely involved in a need to teach about his individual understanding of art making and its felt relationship to the forces of nature. Sibyl Moholy-Nagy summarized this relationship when she wrote the Introduction to Klee's Pedagogical Sketchbook. Moholy-Nagy wrote that the sum total of Klee's pedagogy relies on an attitude towards reality found in a sensed “reverberation between the finite and infinite, of outer perception and an inner vista, the dual reality of the seen and the felt essence of nature” (Klee, 1925, p.12).

The chaotic elements of chance and unpredictability attract poets and visual artists alike, a fact reflected in neural research that shows cerebral activity to be greater with chaotic than coherent motion (Zeki, 2000). The visual unpredictability of tongues of fire, waves of the sea, clouds in the sky, has always held mesmeric properties for humans. The artist may decide to see them as artistic problems to be solved, or beauty to be commented upon, or both. The experience may be a source of poetic inspiration, taken a stage further than simply looking deeply and absorbing the vision (Ghiselin, 1952). The difference in reaction is a matter of degree, based on experience, the knowledge of means to express reactions to the experiences and an inclination to do so. Biologically we all have the equipment and potential that is extended by an artist's lifetime of experience and depth of involvement.

Discussion of the stages of creative process conducted earlier provides a traditional view of the creative process as somewhat linear in activity, occurring as a number of sequential stages. However, when the artistic component is encountered, where oscillation occurs between stages, the elements of artistic creative process seem to be in confusion and disorder, chaotic. Chaos Theory offers an understanding of this seeming disorder, explaining that the artistic fluctuations of activity are a normal state of affairs that relate to chaotic order. Chaos Theory offers a holistic approach to understanding the operation of an artistic creative process by moving away from linear, mechanistic thinking into a non-linear mode (Gleick, 1987; Hayles, 1991).
Ghiselin describes the creative process as seeming to begin in a state of “chaos and disorder” but considers these words inadequate for such an “organic, dynamic” process, “full of tension and tendency” (Ghiselin, 1952, p.4). The meanings of these descriptors associate well with the language of chaos theory discussed above.

Highly successful creative persons have received much attention from analytical writers wishing to record their experiences, to analyse their processes and personalities, in an attempt to isolate the important elements of the creative process (Csikszentmihalyi, 1996a, 1996b). There are also many reports made available by scientists and artists who wish to share their own creative experiences, either through interviews, or in autobiographical writings (Freeman, 1970; Stevens, 1999; Sylvester, 1993). There are wonderfully descriptive histories, such as that of Gleick (1987), who involves us with a feeling of the atmosphere surrounding the creative development of Chaos Theory itself, one that reads like detective fiction. The development of Chaos Theory reflects a creative process involving many researchers working in various fields of science from around the world, whose stories are interrelated (Cytowic, 1993; Lewin, 1993; Waldrop, 1992).

In reading such works it is noticeable that there is really no difference between the experiences concerning process of scientists or artists. However, a difference is found in the mode of production of verification, in the artist's fluctuating, oscillating procedure, as opposed to the scientist’s laboratory experimentation, which tends to be a step by step process. In comparing the procedures of artists and scientists Koestler (1964) pointed out that artists are often seen to be very analytical and precise, even mathematical in their approach. This may be seen for example in the early use of the exacting measurements of the golden section in paintings by Mantegna, or more recently in the mathematically exact work of Mondrian or Malevich (Gombrich, 1972; Zeki, 2000). In similar contradistinction, scientists may be subjective and spontaneous, seeking beauty in their research (Gleick, 1987).

Koestler (1964) discusses the creativity of the mathematician Poincare, writing that he was guided in his work by a search for harmony and beauty. Poincare and the artist Duchamp were interested in each other's work, discussing progress over coffee, as so many thinkers from all disciplines have over the centuries (Shearer, 1997). It would appear that the commonly accepted view of these disciplines, representing them as differing in their intrinsic approach to understanding, offers a limited view of similarly
creative people. It would seem that the various exponents of creativity vary primarily in
the medium and language chosen for interpretation of new ideas.

As an example of the relationship between visual art and science Gleick (1987) discusses Theodore Schwenk, whose work was essentially that of an artist seeking to find structure in the universe, and finding it in visually discovered patterns of flowing forms. His work relied on an artist's eye, as illustrated in his book, 'Sensitive Chaos' which is full of amazing photographs of natural patterns illustrating all manner of flowing forms (Schwenk, 1965). Gleick (1987) also refers to the importance of the work of D'arcy Thompson and his book, 'On Growth and Form,' which contains a wealth of artistic inspiration (Thompson, 1961). Thompson saw life as a whole, its purpose, design, and physical cause being interrelated. He intuited that forces shaping life and growth are generated by deep-seated rhythms of a universal nature. Thompson (1961) sought to reveal that all dynamic patterns of organic form might be reduced to the unity of one system of interacting forces. He believed them to be involved in a search for wholeness (Gleick, 1987; Thompson, 1961).

Chaos Links with Art Making

Although Chaos Theory originated in the mathematical and scientific fields, its influence has been gradually extending into the cultural realm. Links between visual art and Chaos Theory are found in Taylor (1998a), Gleick (1987), Peak and Frame (1994), Emerson (1991), and Briggs and Peat (1989). These writers recognize the contact an artist has with nature, in studying natural rhythms and natural processes, in the interpretation of their analyses of the visual appearance of nature. They also all recognize the connections between art and Chaos Theory. Artists themselves quickly discovered connections. For example, Hockney (1937- ) showed a fascination for fractals, because, "With a fractal, you look in and in and in and it always goes on being fractal. It’s a way towards a greater awareness of unity" (Briggs and Peat, 1989, p.198).

Similarly, the question of scale is one aspect of Chaos Theory that interests Arnheim (1996) in relation to art theory. In an article discussing the relationship of art to Chaos and wholeness, Arnheim (1996) considers the Theory of Chaos to contain the type of knowledge that is a matter of course to aestheticians. For example, the concept that a whole consists of units that act upon one another as they work to find a balance is apparent in all successful visual artists' work. He points out that the units of a painting
that interact to create a whole are not individual self-contained parts. They act in an integrated way, and are meaningless when separated. Their integration creates an ordered, structured composition, the whole being more than the sum of its individual parts. Arnheim (1996) also relates the concept of attractors to the composition of a painting, which may contain one or more within its ordered structure. He describes a complex painting as "an assemblage of coordinated attractors" (Arnheim, 1996, p.118).

In his search for universal truths, the physicist Feigenbaum also appreciated that in the work of artists he could recognize the same kind of analysis of nature that he used himself (Gleick, 1987; Peak and Frame, 1994). Feigenbaum was involved in analysis of scaling, how big relates to little, the universality of scaling things. He recognized that visual artists do this too, that art is like his work, in that it is theory about the way that the world looks to humans. From an interview with Feigenbaum, Gleick (1987) quotes,

What artists have accomplished is realizing that there's only a small amount of stuff that's important, and then seeing what it was. So they can do some of my research for me. When you look at early stuff of Van Gogh there are zillions of details that are put into it, there's always an immense amount of information in his paintings. It obviously occurred to him, what is the irreducible amount of this stuff that you have to put in (Gleick, 1987, p.86).

Feigenbaum recognized that paintings of Ruysdael and Turner were made in an iterative way,

With Ruysdael and Turner, if you look at the way they construct complicated water, it is clearly done in an iterative way. There's some level of stuff, and then there's stuff painted on top of that, and then corrections to that. Turbulent fluids for these painters is always something with a scale in it (Gleick, 1987, p.187).

In speaking of the similarity between the disposition to work of an artist compared to his own, Feigenbaum continues,

Somehow the wondrous promise of the earth is that there are things beautiful in it, things wondrous and alluring, and by virtue of your trade you want to understand them (Gleick, 1987, p.187).

Emerson (1991) also discusses Feigenbaum's recognition of the connection between his work and that of artists, finding a link between Ruskin's work and Chaos Theory. This link is in Ruskin’s encouragement to students to learn to draw through close visual analysis of the natural world, a matter of scale. There is also a link through
Ruskin's recognition of the importance of an artist's facility to select (Ruskin, 1907b). This they do through the development of acute perception, selecting that which is most important from an infinite amount of information, and around which everything else revolves, like an attractor. In a further artistic activity that relates to that of attractors, Feigenbaum refers to artists such as Turner and their method of visual analysis. They select the most important information from a subject and relate the rest of the available information to that focus.

Ruskin considered that the work of the artist started in analysis of the natural structures of the visual world, creating "systems of proportionate relationships parallel to those of nature" (Emerson, 1991, p150). Ruskin’s own drawings reflect intense visual study and he writes of his visual findings in instruction to learners (Penny, 1989; Ruskin, 1907a). When writing of the visual search for the essential elements of a subject, Ruskin explains,

I call these the governing or leading lines, not because they are the first which strike the eye, but because, like those of the grain of wood in a tree trunk, they rule the swell and fall and change of all the mass (Ruskin, 1907b, p. 231-232).

A beginner artist may not be immediately aware of such lines of order and structure, hidden among so much visual information, but practice leads to deeper understanding,---but so it is, that, as an artist increases in acuteness of perception, the facts which become outward and apparent to him are those which bear upon the growth or make of the thing (Ruskin, 1907b. p.231-232).

In relation to art reflecting self-similarity, and the "ambiguity of scale" Peak and Frame discuss the work of the artist Poons and reference paintings of Pollock, (Peak and Frame, 1994, p.30). Comparison is made between the pattern of a web of leafless ivy, a natural self-similar pattern, and the paintings of Pollock, both seemingly a spontaneously created mass of lines, but on analysis both containing particular types of complex pattern. Peak and Frame (1994) also refer to the work of artist Ellsworth Kelly, which consists of paintings of grids of color, placed by 'chance' in relation to one another, and other paintings that were based on rigidly structured grids. The most aesthetically pleasing to the observer are those relating to 'chance,' that were painted according to his natural instincts. Kelly’s painting is compared to the music of John Cage, which, to the untutored ear, sounds like uncorrelated noise. It is also referred to
as a 'chance' construction (Peak and Frame, 1994, p.36). Here, ‘Chance’ appears to be used as a term that relates to natural, instinctive actions, those that are not consciously initiated.

Artist and art theorist Shearer (1992) has written of the influence of Chaos Theory and Fractal Geometry from the point of view of a sculptor, noting the inevitable cultural impact of new scientific theories. Her own sculptures reflect this influence (Peak and Frame, 1994; Shearer, 1992).

The relationship of the artist with a piece of artwork was discussed earlier, when feeling for the work may be an intense and all involving experience, involving the whole person. Taylor (1998a, 1998b) both a physicist and a visual artist, became very involved in analyzing the construction of Jackson Pollock's paintings, those that date from the early 1950’s. He studied the paintings using computer analysis, analyzing the swirling shapes of Pollock's arm movements, as evidenced by the drip, dribble, and flow of the paint on canvas. He found a definite correlation between Pollock's work and the patterns of fractals, reflecting Pollock's relationship with nature and his own natural human systemic pattern. Taylor also points out that this was not a new painting technique and that Max Ernst earlier described similar dribble and splash techniques of painting in 1942. Ernst was involved with surrealist painters in exploring ways in which artists could obtain free access to expression of subconscious thoughts and feelings (Taylor, 1998a, 1998b). This might be seen as artists attempting to access and tap a natural order unimpeded by intervention of the conscious mind.

Pollock created his paintings, which have been shown by Taylor to reflect naturally formed fractal patterns, whilst working quite 'spontaneously.' That is, he did not plan the patterns consciously, but allowed them to emerge from a prepared mind (Finke, Ward, and Smith, 1992). Pollock's own description of his method of art making and relationship with his work verifies this analysis of his process. It also points to his felt need to become as closely involved with the painting as possible. Writing in 1947, he states that in working:

On the floor I am more at ease. I feel nearer, more a part of the painting, since this way I can walk around it, work from the four sides and literally be in the painting. This is akin to the method of the Indian sand painters of the West. When I am in my painting I'm not aware of what I am doing. It is only after a sort of 'get acquainted' period that I see what I have been about. I have no
fears about making changes, destroying the image etc., because the painting has a
life of its own. I try to let it come through. It is only when I lose contact with
the painting that the result is a mess. Otherwise there is pure harmony, an easy
give and take, and the painting comes out well (Friedenthal, 1963, p.271).

Structured Order

Chaos Theory has made its way into social science, the arts, medicine,
psychology and physical sciences, economics and many other fields due to the
understanding it provides of interdependent structuring (Allman, 1993; Bolland and
This structuring also applies to the artistic creative process system, which may be
viewed as consisting of interrelated stages or sub-systems; each one of which is
composed of its own individual and complex natural self-organized structure. Self-
organization structures the complexity presented by such a large input of information as
that dealt with by the creative process (Hayles, 1991).

It is possible to recognize this structured order in the activity of visual art
making as a system with set requirements needed for it to function. Predictable
elements of the process are those stages discussed in general terms above. Their
unpredictable details are provided by the contextual boundaries that relate to the
individual artist, structural boundaries within which the artwork is created. For
example, the particular knowledge base, the materials that are used, the pattern of
thought needed to initiate the work in this domain. The pattern of growth of an artist's
work follows an individual course, unpredictable in detail, confined by personal
contextual limitations. In this way the predictable combines with the unpredictable, in
the structure of the creative process, and a sense of order is achieved, resulting in the

Hence through Chaos Theory the four recognised stages of development of the
artistic creative process may be understood to be not as finite, or in fact as limiting in
structure as they may at first appear (Patrick, 1937). The stages of the creative process
may be viewed as interdependent, interrelated, interacting sub-systems of a whole
interrelating dynamic system. One does not feel constrained by having to move
decorously from one stage to the next, but, in the way of Chaos Theory and the natural
order which it implies, there is freedom to work within the over all structure of the
limitations inevitably provided by the domain contextual boundaries. In this way it is possible to understand that artists may be seen to be working within a set order when they work by constantly fluctuating in concentration, by moving from one stage back to a previous one, or the one before, then returning, forward and back, merging elements within the structure of their set contextual limitations.

The main dynamic of growth in the creative process comes about from linking new ideas with aspects of already accumulated knowledge during the stage of incubation. This stage of the process leads to an emergence of inner understanding, reflecting order emerging from a relatively small complex system into an infinite world of complex, unfolding change. It is a process of self-organization that structures the chaos and disorder presented by such a large input of information occurring during the artistic creative process. In viewing the creative process as a ‘chaotic’ system it is possible to understand how the process works and relates to all other such activities. It is a way of envisioning holistically the component parts and their interdynamics that lead to the creative product (Hayles, 1991).

The dynamic patterns found to be affecting change are applicable to many situations, and in a variety of forms they provide a holistic order. Chaos Theory explains that change may happen suddenly following a quiet, stable period, as with reports of sudden illumination in the creative process. This is the normal functioning of a self-organized process, energy build-up causing pressure, followed by flow. This process explains what happens when an artist oscillates in their work, moving from one phase of the creative process to another and back again, continuously making new forms and moving along, constantly reorganising, and reaching higher and higher levels of an interwoven structural network (Goerner, 1995). So this creative process is an example of a positive feedback cycle, and allowing change to happen in this way is the challenge for an artist. This concept of the positive feedback cycle may also offer a lynch pin for teaching the creative process through art.

**SUMMARY**

Chaos Theory provides a means of understanding that is shared by many domains including those of mathematicians, physicists, artists, and physiologists, working on analysis of natural processes. Their knowledge is acquired from the same source, that of nature itself, and is therefore intrinsically related. It is reasonable to
suggest that creative ideas developed from similar sources must be interrelated. Therefore, on reflection it is possible to understand that there are links between the ways creative thoughts develop in all these areas of study. The universality of the creative process provides a strong link. Links with Chaos Theory emphasize that the creative process is a natural, integral part of life, and that as a natural process the potential for creative development is within all of us.

The artistic creative process ties with Chaos Theory would appear to be strong; therefore a deeper analysis of links with the creative process would appear to be indicated as an important contribution to understanding the creative process and how it may be best seen in educational context. To this end, the next part of the study is devoted to an investigation of the mechanics of the stages of the creative process discussed above, in order to better understand their interaction, interconnections, and interrelationships. The interrelating stages of immersion and incubation are accepted as the basis upon which the creative process builds, with their main activity involving the human processing of information. Deeper investigation of the processes involved during the stages of immersion and incubation provide the direction of the next stage of this study, followed by discussion of the ‘stage’ of verification of creative process results through artistic expression/interpretation. Therefore the next step in this study is to focus on the processes of immersion and incubation, then that of expression/interpretation.
CHAPTER FOUR
FOCUSING: IMMERSION AND INCUBATION

"art as a mode of knowledge....of revelation of the inner nature of things"
(Dewey, 1934, p.288)

What is intended in this chapter is not the statement of an epistemology, but a review of theory in relation to the processes involved in art making that are connected with the artistic, or aesthetic mode of knowing (Eisner and Rehage, 1985). In exploring the artistic creative process, the emphasis will be on how we are thought to gain knowledge through and in the artistic creative process; that is, the methodological question, rather than attempting to form an itemized list of the particular knowledge that may be gained. It will be necessary to identify domain relevant areas relating to the creative process because they affect the way that information may be gained. These are also relevant because they relate to the pedagogy involved in teaching and learning the artistic creative process.

In an attempt to understand the stages of immersion and incubation it is valuable to explore current understanding of the method of information processing utilised by artists during the creative process. This is in order to gain deeper insight into the part that gathering knowledge plays within the artistic creative process. Biological and physiological references receive mention in a developing discussion of the mechanics of the creative process in relation to the individual artistic reality that develops and is represented by art making (Werhane, 1984). The focus of this chapter, then, is on knowledge and knowing, and the manner in which the mind and brain deal with information acquired from a person’s interaction with the world through art making.

I – PREPARATION/ IMMERSION

Chapter One reveals the need for a period of preparation and deep immersion in knowledge relevant to a particular creative domain. This initially appears to serve as a precursor to the more technically active stages of the creative process of making (Csikszentmihalyi, 1996a, 1996b; Gardner, 1993; Ghiselin, 1952). There are two aspects to this stage of the process. One involves preparation of the artist, the practical readying of a work situation, technical preparation of materials, and preparing the mind for work. The other involves actively gaining new information, and developing
knowledge around a particular topic that is to form the focus of the creative work. These areas of preparation combine to form the structural basis for domain specific knowledge, involving appropriate skills.

The skills that are relevant to the domain of the visual arts, and therefore relating to the visual artistic creative process are summarized as follows:

1. visual perception - the development of visual awareness; associated cognitive ability - conceptual skills and interpretative understanding of what is understood through seeing;
2. technical ability - consisting of skills in using media for art making, and understanding the medium's intrinsic nature;

These elements are all interdependent and perhaps the last may prove to be the combined functional result of the previous two. Although the conceptual element also connects all these structural components of the domain, incorporating developing ideas about subject matter, personal inclinations and directions of thought (Amabile, 1983; Ghiselin, 1952; Weisberg, 1999). There is an interrelationship between these parts that makes them indivisible in the practice of art making. Therefore, consistent with the holistic viewpoint of the present dissertation, the elements listed above are envisaged functioning as self-organized sub-systems, interrelating within a larger whole, that of the art making domain, the context of which supplies the structural foundations and boundaries of the individual artistic creative process.

The domain preparation for the artistic creative process is a conscious act of labour, preparing the mind, materials, and physical working space. It consists of collecting and mastering information relating to a topic of interest, and learning appropriate techniques and skills of interpretation. It involves absorbing new information, and understanding on a specific topic by means of observation, exploration of ideas, and practical technical experimentation. Conceptually, it involves divergent thinking, an open-minded approach that allows fresh ideas to emerge. An experienced artist's preparation often demands total immersion, a period of intense concentration, in what may sometimes be an extensive and varied amount of information around a topic, plus the absorption of understanding related to practice of domain related technical skills (Ghiselin, 1952; Nickerson, 1999).
This would imply absorption of a great deal of new knowledge and understanding, perhaps as much as may be available to the artist at the time. However, it is interesting to note that Weisberg (1999) considers maximum creativity to occur with a middle range of knowledge, and that it is possible to have too much or too little knowledge for the process to function at an optimal level. He maintains that it is possible that too much knowledge can sometimes work against creativity as it may be too tied to previously acquired knowledge, and is limited by the anticipation rendered by habitual reference to that knowledge (Nickerson, 1999; Weisberg, 1999).

It is accepted that prior knowledge affects perception (Arnheim, 1954, 1969; Delcomyn, 1998; Lewin, 1935). In the human organism's internal interaction with perceptions of the external world, in the creation of a self-organized individual reality it has also been noted that memory is unreliable. Arnheim considers that "memory is a more fluid medium than perception because it is removed from the checks of reality" (Arnheim, 1954, p.84). “Whatever we call reality, it is revealed to us only through the active construction in which we participate” (Prigogine and Stengers, 1984, p.293). Arnheim (1969) discusses the work of Lewin (1935) in this context, and the effect of prior knowledge on perception. Arnheim refers to anticipatory images, made according to our changing things to fit previous images, according to 'trace patterns.' Anticipation is a hurdle created by not only previously collected images, but also by repeated exposure to these images, creating habitual pathways of exploration (Delcomyn, 1998).

Alternatively, cognitive habits, if positive feedback cycles, may be of use in the preparatory stage of the creative process. Preparation for work is also a matter of individual habit, and it is habitual behaviour that establishes the appropriate state of mind for the job in hand (Stein, 1974). Habit provides a quick means of reaching the freedom of mind necessary for the developing stages of creative making to begin. It is evident in comments by some artists that they often find it necessary to 'warm-up' the brain, perhaps preparing the habitual mental pathways appropriate to the work in hand (Ghiselin, 1952; Hawley, 1993). These might be activated by retaining habits of work developed over time, in a particular setting, perhaps a writer sitting to write at a particular time every day, with a particular pen, a certain chair at a certain desk, and so on. This activity links reality in the form of concrete processes to purely mental processes in creation of habits of working (Stein, 1974; Wallas, 1926). For a visual
artist ‘warming-up’ may mean reviewing work of the previous day, or making some rough drawings in order to tune in to the train of thought felt necessary for the work in hand. These habits of revisiting sensory stimuli are a means of connecting with an ongoing train of thought relating to a continuing piece of work. This activity also reveals any new interactions that may have occurred preconsciously in the interim since a continuing piece of work was last touched (Ghiselin, 1952). Similarly, approaching a new work may be aided by preparatory familiarisation with the subject matter.

Preparatory immersion requires an initial conscious cognitive effort. In fact, the term ‘immersion’ seems most appropriate for use at this stage as the artist becomes gradually more deeply involved in the art making activity. The act of drawing from observation exemplifies exactly this type of involvement, requiring choices to be made before work may commence. These may concern choice of subject matter, materials to be used, and work context. Perceptions are different during the act of drawing; they are visually intensified and totally focused, allowing no intervention from outside influences (Edwards, 1998). Often a person deeply involved in concentrating on a drawing, working within a group situation, will appear to be deaf to sound, not hearing nor being distracted by noise, speech, or other potential interruption. Such a level of concentration enables the retention of extremely clear memories connected with the drawing, which return vividly with an "almost eidetic quality" (Edwards, 1998, p.168). It is an experience of such intensity that is not translatable into verbal explanations of knowing. Such a deeply reflective state is not unusual, but may be evident at varying levels of involvement within a group of artists (Edmonston, 1962, 1975). When focusing and stabilizing attention we are concentrating our energy, aiming all we are able to spare at one specific object (Palmer, 1998). Csikszentmihalyi (1998) refers to examples of artists reaching a level of concentration that cuts out all but the activity in progress. The result is the sense of flow described by Wolseley and Pollock above, when there is a feeling of the whole person being involved in the chosen activity (Hawley, 1993; Taylor, 1998a, 1998b).

In describing the ‘flow’ experience, Csikszentmihalyi (1998) writes of its ‘autotelic’ nature, by which term he means that there are no exterior goals or rewards that intrude on the process. Similar to the experience of ‘play,’ the art making process is totally involving, and the end product of little or no immediate relevance to the artist. It is an experience that is a means of self-communication and thereby a process that facilitates
an exploration of personal understanding (Csikszentmihalyi, 1998). An artist will look back in reminiscence at a painting made at another time and remember some of the experience of its making, and this is where its later meaning lies for him or her, in a retrospective judgment made through the eyes of additional experience. It is different from that perceived at the time of making. The painting may also be considered to own a different meaning in the light of its cultural context, if offered for absorption into the social domain.

The preparation stage of the creative process often appears to take a lot of time and energy, although artists may discount its importance when discussing their creative processes. They are so much more interested in the deeply involving and more exciting process of actual art making, and the preparation seems tedious and uneventful by comparison, however closely they may guard their habits of preparation (Ghiselin, 1952).

Therefore the depth of immersion in the creative process equates with the depth of the meditative state of mind that may occur (Austin, 1998). This state may be actively sought, or develop naturally as a result of the process, enabling connections to be made at the deepest level of understanding. Towards this end, attention and concentration are considered basic mental skills necessary in the development of deeper understanding in the field of art making. Through the activities of attention and concentration art making combines new understanding of meaning with that gained from previous experiences.

**Knowledge from Experience**

James (1909) concluded that knowing is a process that takes place inside the relations surrounding concrete experience. The objects or parts of experience are held together from one to another by relations that are themselves parts of experience. The directly apprehended universe needs, in short, no extraneous trans-empirical connective support, but possesses in its own right a concatenated or continuous structure (James, 1909, p. XII - XIII).

In related discourse, Dewey (1934) maintained that as mind is formed from a process of interaction with the world, then its activity is aimed towards that world in intention. In this vein, Dewey (1934) wrote referring to the importance of experience for the creative artist, pointing to an understanding that experience becomes part of the person. “Aspects and states of his prior experience of varied subject-matters have been
wrought into his being; they are organs with which he perceives” (Dewey, 1934, p.89). In the same vein, Dewey describes memories as being “organically incorporated in the very structure of the self” and so becoming one with the new experience (Dewey, 1934, p.89). Any meditative or reflective activity is not a withdrawal from the environment but a time of review and development of understanding regarding personal relationships with the world.

These ideas constitute the core of that philosophy which is Pragmatism and which is intimately associated with the names of Dewey (1959-1952), James (1842-1910) and Pierce (1839-1914). Pragmatism emphasises the essential connectedness of mind and world. This philosophy in its recent expression has returned to a degree of credibility to the ‘agentive self,’ that is, the idea of an active, meaning-making subject in interaction with others (Colapietro, 1990). And in both its original statement and restatement it is consistent with ideas developing in Continental philosophy around the same time, but of which its seminal writers were generally ignorant; that is, phenomenology, and more particularly its so called ‘hermeneutic form’ which had a renewed emphasis on meaning-understanding of the world (Bubner, 1981; Spiegelberg, 1960).

Maturana and Varela (1992), who emphasise the concept of knowledge arising from absorption of experience, take this view into the physical field. They maintain that the structure of the process of gaining knowledge by experience may be viewed as biological, involving the absorption or inhibition of information presented by the immediate environment. It is a biological balancing act, whereby experience dictates the selection of incoming information.

Experience of daily life is always with us as the focus of our being alive. Weisberg (1999) comments that it is not possible for an artist to write about deep insights into life unless that artist has deep insights to express, and these will only arise from experience of life. Experience teaches us about ourselves and about our relationships with our environment, and whilst wholly theoretical learning may offer ideas and possibilities developed by the mind alone, even these are still based on stored information, collected during and influenced by life's experiences. This is clearly illustrated by reference to the work of Arnheim (1985), Dewey (1934, 1938), Eisner and Rehage (1985), Jones (1996d), Kolb (1984), Maturana and Varela (1992).
In the same way, what we see is dictated by previous experience and the beliefs and meanings that have accumulated during a person's lifetime. In relation to art making, 'epistemic seeing' is regarded as providing access to the kind of knowledge acquired through visual experiences. It is influenced by the interpretation that memory has created from experience, and thence we each have our own private perceptual world. In this way we create our own visual realities (Arnheim, 1954; Eisner and Peshkin, 1990). Epistemic seeing, or knowing from seeing, is a chief resource for “discovering the content and character of our surroundings,” but it must always be born in mind that whatever we see is influenced by what we have seen before (Dretske, 1969, p.78). Selections are made from that which is presented to our senses by concrete experiences and we select and comprehend what we see according to information collected from previous experiences.

In Chaos Theory terms, James’s concept that knowing taking place inside the relations surrounding concrete experience relates to the concept of autopoietic structure of an experience and the boundary that is set by the context of that concrete experience. James (1909) and Polanyi (1969) also point to the meaning carried by those subsidiary areas on which we cannot focus, the fringe elements on the edge of understanding. In fact, this is discussed at length by James, who considered that this subsidiary meaning-making process is how we negotiate through life, via the link between foci, and the selection mechanism that governs our progress (James, 1884a; Polanyi, 1969). Thus the flow of ‘fringe’ information is considered invaluable, providing integral background interactions that are the environment of objects of thought (James, 1890b). James’s description of the fringe elements in the stream of consciousness can be related to the 'noise' factor in Chaos Theory, where this information is similarly valued as reflecting a pattern of activity found around the attentional focus or attractor (Abraham, 1995; Freeman, 1995).

This suggests how we see things in relation to one another, the ‘real-life’ elements of space and distance that define an object, or in visual art for example, the background running behind parts of a still-life painting that unites the separate parts into a whole. It is the negative spaces in a visual study, which, once seen, make sense of the completeness of a visual composition. It is the holes in a Henry Moore sculpture that are almost more important than the solid shapes that surround them. They are strong
forms in their own right, providing a link between the solid forms and thereby creating an interrelating whole that is more than the sum of its individual parts.

Artists emphasize such visual links because they understand their importance. The visual interaction of positive and negative shape and form provide vital information for an artist, opposites balancing the integrity of the whole (Arnheim, 1954; Read, 1964a). Integration of new experience with old leads to deeper understanding of these complex relationships by extending the knowledge base of the artist in every aspect of visual experience.

**Processing Visual Experience: Epistemic Seeing**

In order to more fully understand how visual experience is processed it is of interest to explore what is known concerning the neurological dimension of vision. This is in order to find out whether there is a correlation between the ways the brain processes visual information, and the art that is produced relating to this information. It may help to explain how ‘epistemic seeing’ works.

Over the last twenty-five years the human visual system, as an easily accessed route to the brain, has provided researchers with an enormous amount of information, particularly in the area of functional specialization of different parts of the brain (Zeki, 1998, 2000; Zeman, 1998). Art making concepts explored by Arnheim (1954) are now recognized as reflections of physiological function. Vision is now seen as an active process, open to continuous change, which makes sense since "we see in order to be able to acquire knowledge about the world," and the world does not stand still (Zeki, 2000, p.4).

Zeki (2000) points out in his biologically based theory of aesthetics that the only material at the disposal of the visual artist is the visual knowledge held by the brain, and that art must obey the laws of the brain to exist, or we would not understand it at all. He also considers art to be a means of approaching 'truth,' of finding constants and essentials in the face of continuously changing sense data (Eisner, 1998; Zeki, 2000). It is this search for constants which makes the brain independent of a singularity of direction suggested by constant change, and able to keep an individual mind open to new information, as shown by its capacity for selection (McDermott, 1977). The senses provide new incoming information continuously, from which the processes of the brain are able to select items appropriate to the needs of the body and mind. The artist creates...
an art object that represents a transient concept derived from a selection from the stream of thought. The selected object is made concrete, before the artist continues the search for constants, constancy, and a homeostatic balance.

Knowledge of the physiological structure and function of particular pathways in the brain has yielded information of particular interest to artists. Due to advances in understanding of brain function it is now possible to explain how visual messages received by the eyes travel to areas of the brain where they are processed and interpreted according to the information they provide. Zeki (2000) has put forward a biological theory of aesthetics, ‘neuro-esthetics’ that is based on this knowledge of visual process. He has compared the work of many artists to his own knowledge of the ways the brain processes visual information and found interesting correlations. He feels this connection to be of great importance in understanding why and how art has developed in the way that it has. According to Zeki's (2000) research, the development of art has in fact followed, or moved in advance of, the developments in reasoned scientific research of processes of the brain, by working directly through the senses. The senses are directly in touch with the brain's evolutionary development, as opposed to the research process that follows sensually disassociated processes offered by laboratory based scientific methodology (Zeki, 2000).

It would seem that evolution has created in the brain a system that works to isolate from the environment those visual elements that are most appropriate to the organism at the time. For example, colour is acknowledged as a biological signalling mechanism used in connection with primary biological functions (Zeki, 2000). We appear to be more habitually attuned to the subtle colours of nature that do not usually present intense, ‘pure’ colour, and the brain has developed a separate area of colour processing to deal with ‘pure’ primary colours (Zeki, 2000). In relation to this phenomenon it is interesting that Zeki notes that the ‘pure’ primary colours that are often used in abstract paintings activate different, more limited areas of the brain than do those of natural colours. The latter have been found to activate many more areas of the cortex and hippocampus. The art of the Fauves, who felt they wanted to liberate colour to make it more expressive, was in fact working in opposition to the natural processing of colour. In creating paintings using non-natural colour they made works that viewers found challenging to understand, and which were therefore very controversial (Zeki, 2000).
The information gained by modern processes of analysis of brain activity indicates involvement of particular visual areas of the brain according to the information being processed. For example, linearity, depth, motion, colour, or even more detailed analysis such as a specific angle of inclination of a line, or subtlety of tonal variation are all allocated individual processing areas in the brain. All neural cells in the particular areas of the brain that deal with these various types of information, have been shown to process only their own specialized type of incoming information. Each one has its own responsibility, its own area of knowledge (Zeki, 2000). The individual visual areas of the brain are autonomous, so that if one of them is damaged, then there is still access to information about an object via another area of the brain.

Reading Zeki's description of visual brain processing emphasizes the enormity of this function of the brain. In order to cope with a never-ending bombardment of visual information the brain processes incoming information in various parts of the brain simultaneously. This is referred to as parallel processing, but it is not performed synchronously. Zeki (2000) suggests that the brain has several of these perceptual systems, joined in such a way as to form a unified percept, although research has not yet verified the form of the phenomenon that binds the visual elements together. The percept is the outcome of the process of perception that is experiential (Reber, 1985). This is a similar picture of brain function to that presented by Greenfield when describing her concept of a neural assembly (Greenfield, 2000; Jones, 1996c). It presents an image of an immensely complicated function of the brain that is a crucial element of visual art making, coping with analysis and selection from an enormous amount of incoming information. During art making visual perception is one of the coordinated, interrelated, interconnected activities that is taking place.

T.E.Feinberg (2001) makes a case for a physically grounded account of the mind/brain relationship, which produces mental states. He considers a concept of ‘nested hierarchies’ as a holistic one according to which the various levels of activity are composed of one another, as opposed to a pyramidal structure of hierarchies in which there is a clear-cut top and bottom.

However, research has shown that there is a temporal hierarchy activated in visual perception (Zeki, 2000). Colour is perceived before form, which is perceived before motion. This is illustrated by reference to the work of artists. For example, those who are interested in motion, such as Calder or Tinguely made mobile sculptures,
many from uncoloured or single coloured metals. It seems that colour would interfere with a clear understanding of the mobile in motion. Alternatively, other artists, for example the Impressionists, have concentrated on studying colour interaction. Later artists, for example Mondrian, sought visual essentials by exploring the use of line. Mondrian’s use of colour enhances and supports the line. Similarly, according to Zeki (2000), the works of any visual artist may be shown to reflect that their particular area of interest relates to the corresponding area of brain function.

The work of Zeki (1993, 1998, 2000) serves to emphasize the interconnectedness of brain processes and human artistic behaviour. The pattern of behaviour of artists such as Mondrian, who were consciously searching for essential truths in constancy of form, reflect the basic functioning of the brain, and this is where the source of the meaning of their work lay, in a biologically essential truth of function. This is important in reaching an understanding of the normal child who is building knowledge of the world by compiling a visual record, developing an understanding of their own visual truths, creating understanding of the individual realities in which they live, through ‘epistemic seeing,’ vital information for any artist or art teacher (Zeki, 2000).

**Contextual Considerations**

As mentioned in the introduction to this section of the study, the context may be seen to incorporate the physical place and setting surrounding the artistic activity, and the materials used for art making, in creating the preparedness of the state of mind of the individual artist for working. Therefore, any knowledge gained during art making directly relates to the context of the activity and consequently is influenced by and interrelates with all aspects of that context.

The context of mental preparation for art making is of vital importance. This is because an art maker is one who works to develop an understanding of their own contextual reality through their art (Palmer, 1998). The gathering of knowledge depends on an artist's interpretation of their contextual reality at a given moment in time (Werhane, 1984). There is a state of anticipation experienced by an artist that may be loose, relaxed and open to newness in experiences, but at the same time restricted by the expectation that prior knowledge dictates (Gardner, 1993; Maturana, 1990; Nickerson, 1999; Weisberg, 1999). It is an uncertain experience because it is dictated by the total
contextual receptivity, including mood, and the biological situation of the artist that also is constantly changing.

Cultural Contextual Experience

Cultural contextual considerations greatly influence the approach to art making by an artist. They provide both an element of structure for the art-making domain as a cultural whole, and influence the individual artist’s work, affecting the mode of making, and any expectations of results. Stones (1966) reflects on the importance of cultural context when he states that it is his belief that our brains have not undergone any more recent evolutionary change, but that “Cultural change has replaced evolutionary change” thereby resulting in more complex activity in modern man (Stones, 1966, p. 30).

This idea is taken further by Dawkins (1989) in his concept of an evolutionary socio-cultural phenomenon. He noted that ideas have spread from brain to brain and generation to generation throughout the history of mankind. They are like a physical infection, their power continuing long after the physical properties of genes have faded. These established ideas are responsible for the development of societies and cultures (Dawkins, 1989; Morton, 2000a, 2000b). Blackmore, in discussion with Morton (2000b) stated that the function of human creativity is as a selection process whereby competition between memes produces new combinations of this culture gene, thereby explaining the variety in the growth of cultures worldwide. Their impact on the creative development of individuals is therefore intense.

Eisner (1998) considers that self-knowledge becomes full of value-laden categories as a result of acculturation. The cultural context is responsible for the development of all knowledge connected with communication, and as such it commands a restrictive influence on knowledge development. This is because there is considered to be a danger in the liability of antecedent knowledge because it frames our perceptions.

Contextual considerations may therefore be regarded as negative influences, as restrictions, that are reflected in the way that knowledge is acquired, and in what knowledge is acquired. They provide a boundary to the artist’s functioning structure that is difficult to break through. In this way anticipation based on past experience influences the development of culture through the communication of that culture via
language, and our language influences our perceptions, whether verbal or visual (Eisner, 1998; Weisberg, 1999). Such activity can be found evidenced in different areas of communication in society. For example, the complex languages found in universities from one discipline to another. “Yet labels and theories are not without their costs. The very order that they provide engenders expectations that often impede fresh perception” (Eisner, 1998, p.67).

Research experiments have shown that artistic language is a culturally learned means of communication, one of habit and anticipation (Eisner, 1998). It is thus that a way of seeing may also be a way of not seeing or understanding what is seen. This ‘not seeing’ is dictated by habituated usage of all language and meaning, and a conscious effort is needed to alter this habitual approach. In art making for example, when drawing a familiar object such as a chair, viewed from an unfamiliar angle, perhaps from a foreshortened viewpoint, it is necessary for the artist to set aside their previous visual knowledge of the object seen perhaps habitually from the side (Ruskin, 1907b).

In this regard Edwards (1998) has achieved success in teaching a visual approach to art intended to give people a fresh attitude towards looking and seeing. She suggests they look at and draw an object seen upside down, in order to give them a fresh visual attitude towards an object, providing a fresh way of looking and understanding what they are seeing at that time. Such an experience alters the artist’s perception, increasing their visual vocabulary, incorporating a fresh viewpoint into their habitual, structure of activity.

**SUMMARY**

Knowledge gained by experience may be limited by that previously acquired. It also appears to be dictated by biological structure and function. The other vital element in knowledge acquisition appears to be contextual. The personal context, the biological state of a person at a particular moment in time regulates how they perceive, and therefore what they perceive. Cultural conditioning provides boundaries that restrict, or contain the direction of work of an artist.

The dynamics of knowledge acquisition in the artistic creative process therefore appear to rely on the whole contextual structure presented by the artist concerned, incorporating the outer environmental context within which they function.
II - INCUBATION

The incubation stage of the artistic creative process is essential to this study as it points to the heart of the reflective activity. Questions arise here relating to processing information through selection of relevant material, and the elements that influence this activity. These include considerations of consciousness and thought,

Consciousness and Thought

In discussing consciousness, James noted that it had several main features (James, 1890a). The first is that we have a sense of personal consciousness, with an awareness of its continuously changing states. James suggested the phrase 'a stream of consciousness' to describe this ever changing experience (James, 1890b; McDermott, 1977). He also noted as important that in our constantly changing state of consciousness with its sense of continuous time, thoughts are still attended to one at a time. A third important point he made is that consciousness has a fringe to its focus, providing a sliding stream of impressions at the periphery of attention. Fourthly, consciousness acts selectively in its choice of focal object from the stream of information with which it is continually bombarded.

Also, James stated that consciousness exhibits recognition of relations between elements of focus. That is to say that feelings generated by the relations of thought imbue the objects with meaning, indicating that selection is influenced by emotion (Bailey, 1999; James, 1884a). Finally, James pointed out the importance of noting that human thought is able to incorporate new objects that originate outside itself (McDermott, 1977).

James referred to these relations between foci as the “transitive parts of thought's stream” and considered them vital, but often dismissed, components of the flow of consciousness (James, 1884a, p.3). He considered that there is far too great an emphasis placed on the 'substantive parts' of the stream, the objects of focus. The interacting transitive links that form between the more definite objects create the fluidity of the stream taking us from one thought to another (Bailey, 1999).

McDermott (1977) claims that one of the central preoccupations of James's entire life was the belief that we sense feelings of the relations that exist between objects of our experience. Such a feeling cannot recur, as it is affected by the continuously changing subjective state. It is a feeling of an object "in those relations"
only, and there is no return possible because the brain is being continually modified by one part's activity affecting tensions in all other parts (James, 1884a, p.11). The feeling is transitory, soon transformed by the nature of the ever-flowing stream of consciousness; but it is the vital link between objects of thought. Evidence of this is found in human speech with its variety of inflections that express feelings of relation between the objects of thought (James, 1890b). In the way that words in language such as ‘and,’ ‘or,’ ‘of,’ carry their own meanings, so do the feelings connected to relations of thought. This understanding of relations of parts of thought process offers understanding relating to the flow of reflective activity that is felt during art making. Artists feel their way through a piece of work, commenting that something ‘feels’ right or wrong in what they do.

On this point, in searching for the elements that may contribute to incubation, in the reflective process of art making, one direction is taken from the issue of whether there are ‘states of consciousness,’ such as the previously discussed ‘preconscious.’ This topic was investigated by Tart (1969, 1975) who represents them as a system of separate sub-systems consisting of the elements: emotion, memory, cognition, perception, and sense of self. These separate sub-systems were considered by Tart (1969) to form an interconnected whole.

Combs (1995) developed the work of Tart (1969), and with the benefit of exposure to more recent neurological research he presents a picture of various states of consciousness woven together "in Mobius strip fashion," more closely interconnected than in the relationships envisaged by Tart (Combs, 1995, p.135). The various states of mind, from ecstatic religious states to various subtle moods, are considered the result of outside influence causing inner forming processes to create conscious reactions. Combs builds an image of the states of consciousness as powerful attractors, moving in a phase space whose limitations are provided by the structure of the brain (Combs, 1995; Combs and Goerner, 1997; Morris, 1991). He envisages the states of mind as processes with separate hierarchical structures each confined by its own autopoietic limitations and boundaries. In this concept, each state still includes emotion, memory, and cognition. All these elements, which Combs labels "lower order processes" are interrelated inside the boundaries of each state of mind (Combs, 1995, p. 135).
Memory

If the functions of states of consciousness are viewed in relation to the stages of the creative process, then memory appears closely connected with the function of sorting and storing information. From the time of preparatory immersion, information is brought into the preconscious where incubation can take place. Links are made, creating connecting networks in the brain between related information, and foci are formed, which reach consciousness as changing ideas and thoughts relating to a topic of study. This is thought to be initially achieved through the function called ‘working memory’ which provides a facility for short-term storage of a limited amount of incoming information, whilst the ‘executive processes’ of selective attention and task management organise the material (Baars and Newman, 1996; Smith and Jonides, 1999). In this view, selected material is referred to long-term storage, or memory. This facility is understood to be situated in many different areas of the brain, and is believed to hold an enormous amount of stored information (Pribram, 1971).

Recent research by Baars and Newman (1996) has also shown that knowledge may be drawn from the deeper recesses of long-term memory into short-term working memory very quickly when necessary (Jones, 1996a). A very important point that relates to previous comments on habit is made on the subject of memory recall by Cytowic (1993), who notes that memory recall is “tainted with the circumstances of the recall…So each act of recognition and recall is a fresh creative process and not merely a retrieval of some fixed item from storage”(Cytowic, 1993, p. 192). This is directly related to the artistic creative process, and the experience of art making, which is a continuous activity relying on immediate recall to facilitate constantly changing ideas.

The short-term working memory existing on the fringe of consciousness has been shown to store knowledge for a limited amount of time (Delcomyn, 1998). It is considered to hold memory of incoming information for a period of up to several hours. This is long enough for the information selection system to either integrate or reject the information (Jones, 1996b). The preconscious working memory is therefore understood to provide a function whereby all available knowledge may interact; both the new and that previously acquired, thereby creating new understanding through selection from the constant flow of incoming information, as James (1890b) suggested (Jones, 1996b).
Networks and Patterns

A current concept of the processing brain is that of a multitude of interwoven, interconnected neuronal systems, or networks, that are reacting to moment by moment input, influenced always by what has gone before in the creation of a system of ongoing knowing. Networks are strong, so that breaks in network patterns can often leave the whole relatively undisturbed. The holistic structure of a network collective defines its phenomenological character (Greenfield, 2000). The neurological research of Greenfield leads her to describe the concept of a neural assembly that explains the changing processes, or states, of the brain (Greenfield, 2000). She suggests that networks of neuronal cells in the brain expand and contract in a way that indicates pathways may be linked at one moment and disappear the next. Greenfield suggests that one neurone is capable of structural coupling with many others at once, so providing links with many other networks involved in different processes simultaneously (Jones, 1996c). Greenfield explains the process as a pattern of neural assemblies, like information pathways erupting and fading according to need, the larger assemblies being dominant at the particular moment in time (Greenfield, 2000; Jones, 1996c). James implied that he understood this process when he wrote that whilst the brain is being continually modified, it "always acts as a whole, one part's activity affecting the tensions in other parts" (James, 1884a, p.11). This explanation creates a similar visual understanding of brain process to that of Pribram (1971) in describing an interconnected, interacting whole system (Jones, 1996c).

To return to James (1890a), perhaps there appears to be only one state of consciousness at one moment in time, and we are always conscious of something, so this state is mediated in some way. Our biological chemistry appears to play the vital role in this organization (Jones, 1996b). The components of mental activity can simultaneously belong to many other assemblies, involved in many vital activities of the organism apart from that of conscious awareness. They are controlled by electrochemical reactions, the control of which Greenfield considers to be the neuronal correlate, the connecting element governing the form of the neuronal assembly, the creator of relations between objects (Greenfield, 2000; James, 1890a; Jones, 1996c). Greenfield’s work involves attempts to understand how information is shared within the brain, and made available to the whole body.
Pribram (1971) provides a link between the importance of experience in creating a knowledge base, as discussed above, and an explanation of the link between perception and neural process. He noted that the state of a person's current neuronal organization affects perception; therefore prior experience modifies what we perceive. In order to explain how the brain is affected by experience, Karl Pribram developed the theory of a neural hologram. This holographic model describes the "psychological function of perception and the distributed memory mechanism in the brain" (Pribram, 1971, p.90). Research convinced him that recognition is hard to destroy and that memory is distributed in an organized way over many areas of the brain (Pribram, 1971). This metaphorical picture of an operational brain provides an attractive and truly three-dimensional image of interacting patterns creating an effect similar to that of a moire fabric. Combs and Goerner (1997) refer to these interrelated network patterns as 'process lattices,' a description that produces a similarly evocative visual image of brain function to those of Pribram and Greenfield (Combs, 1995, 1997, 1999; Combs and Goerner, 1997; Combs and Krippner, 1999).

Jones (1996b) also creates an image of the activity of information processing by the brain, explaining it as a complex interrelated pattern of pathways, all at different stages of processing signals. He builds an image of a whole human system of systems reverberating with activity. It is a picture of excitation or inhibition of signals oscillating and resonating so that a whole 'live' human system is activated.

It appears therefore that modern neurological studies are locating brain activity as a system of interconnected networks of neurones. The neurones are capable of interrelation to a number of networks simultaneously. The networks link areas of the brain with cells specializing in the individual types of knowledge necessary for human function, from interpreting visual experience to initiating motor control. The subsystems are linked and controlled by positive and negative feedback loops of chemically induced energy, forming networking electrical wave rhythms. These are conducted by chemical reaction between nerve synapses, providing feedback loops of information (Madison, 1998; Parthasarathy, 1999; Schechter, 1996; Wertenbaker, 1997). These feedback loops form the basic process whereby we cognitively process information, so gaining a store of selected knowledge. The process, that takes place following absorption of information by the senses, is regarded as a current explanation of what is commonly referred to as short-term, or working, memory (Jones, 1996a).
Meditation, Attentional Focus

One recognized method of achieving this preconscious working state of mind is that of consciously induced meditation (Austin, 1998). It is a receptive process of evolutionary origins, employed by hunters of times past and present who become at one with their prey by concentrating deeply in a trance-like state on its actions and movements (Austin, 1998).

Practicing meditation involves a state of awareness of the reality of the present moment, the sense of existing now (Austin, 1998). This state of living in the present may be achieved in two ways; that of concentrative meditation is achieved by focusing attention on a chosen item of interest, and this focus is maintained whilst the mind becomes more absorbed in the focus. The second method is that of receptive attention, which consists of maintaining openness to unfocused attention on whatever experience is available. Both these methods require a relaxed, calm initial state of mind (Austin, 1998). Both these methods are discussed by artists at work, and are accessible by all, to varying levels of attainment (Austin, 1998; Ghiselin, 1952). The practised, professional artist becomes deeply attentionally focused in their work, at a level touching their very identity (Edmonston, 1975).

In this situation attentive perception may be contemplative and receiving in nature, the 'let be' of Taoist doctrine (Austin, 1998). This reflects Freud's concept of “free floating attention” passive and selfless, not egocentric, but dreamy and patient, with no sense of time, not vigilant or impatient (Maslow, 1968, p.87). It is an attitude of relaxed open awareness, reflecting a “willingness to see all aspects of the object” allowing no conscious intervention (Hawley, 1993, p.146). On speaking of such experience and his feeling of closeness to nature the painter Wolseley said, “My work is a form of involved contemplation....Nature moves through your veins in a spiritual way, and then the work of art flows out like birdsong” (Hawley, 1993, p.146).

Maslow calls these moments ones of great happiness, maturity, individuality, and holistic fulfilment in fact the person's "healthiest moments" because they are as close to their real selves, their identities, as it is possible to be (Maslow, 1968, p.97; Richards, 1996).
Selective Attention

Research on selective attention in recent years has centred on how inputs reach consciousness. This is seen by Dixon (1981) to be different from the processing of stimuli connected with subliminal perception and perceptual defence. These reach consciousness only by conscious recognition of physical reactions that have already taken place. Dixon (1981) considers attention to be a major control process of the brain, an energy resource phenomenon, whereby energy is switched to where it is most needed, a concept which relates to the neural network theory of Greenfield (Jones, 1996c).

Attention may be seen to be the organizing function of the brain, used to focus energy by linking networks, a process whereby the working networks become organized around the current activity (JOCN, 1996). It is a motivational state of mind that leads to concentrated awareness of particular experience, linking conscious and preconscious knowledge. Conscious concentration provides the focusing mechanism for this selective process that is in touch with both incoming information from a present reality, and the internal selection criteria set by accumulated individual experience.

There is an interesting account by Erickson (1969) of the state of consciousness achieved by Aldous Huxley when he worked. The two men entered into research on Huxley's creative process, and Erickson reported Huxley to be working in a trance-like state of mind. In this state he was able to answer the phone, and do all kinds of everyday things, whilst being aware only of his train of thought connected with writing (Erickson, 1969). Although this depth of attentional focus may seem extreme, it is not uncommon among artists, requiring deep concentration. A common everyday example is the visual and auditory ‘magnet’ offered by television and the difficulty experienced by one member of the family when attempting to communicate with another whose attention is captured. Those who read books of enthralling adventure, wild fantasy or other involving topics of interest often find that time goes by, and people around them continue activities outside their own focused sphere of awareness. This is simply a natural process connected with selection and attention. The sheer quantity of information with which we are faced every day is dealt with effectively by the process of selection, referred to as ‘meditation in action’ by Tart (1994).

James (1890a) considered conscious thought to be involved in the process of selection, in that it guides the direction of choice towards future needs, because,
"without selective interest, experience is an utter chaos," (James, 1890a p.402). He also regarded the “senses themselves but organs of selection,” because they seem to make choices from an inundation of external stimuli, implying a need for combined functions of selection (James, 1890a, p. 284). The ideas of James are very relevant today when there is great emphasis on developing holistic attitudes towards embodied processes of the brain (Clark, 1999; Myin, 2000).

Bergson (1946) showed a respect for James's holistic attitude towards the senses, in reference to the importance of feelings in experience.

We are absolutely sure only of what experience gives us; but we should accept experience wholly, and our feelings are a part of it by the same right as our perceptions, consequently by the same right as 'things.' In the eyes of William James, the whole man counts (Bergson, 1946, p. 211).

He pointed to the importance of interaction between interest and selectivity in the area of experience, adding that experience is the selector of the elements of interest and constantly interacts with new information presented for acceptance or inhibition. This is the same principle as that adhered to by Maturana and Varela (1980) in their biological framework for experience.

During this process, irrelevant information is excluded in an effort to reach a deep understanding of the focus of concentration. An experienced visual artist will have developed a highly sensitive capacity for visual selection that functions extremely quickly (Edmonston, 1975). Their sensitivity in this area becomes so acute that intensities of visual input may cause physical discomfort, or at the other extreme they may be sensitive to the finest subtleties of visual experience. The habit of visual observation is inherent in a practising visual artist, who will find that they are drawn into identifying with the object of their vision, observing finest detail and nuance in a search for its essential character. This level of concentration transfers to art making, and is held captive in the resultant piece of artwork. As a result of this high level of sensitivity an enormous store of visual knowledge is accumulated from the experience of observation (Edmonston, 1975). It is this aspect of visual perception that provides visual guidance of an activity in an environment that is determined largely by that activity itself (Thompson, Palacios, and Varela, 1992).
Emotion and Cognition

Perhaps the most interesting area of interest for artists in this research is that of sensory processing. Sensory information gathered from the environment is processed via feedback loops. The information passes to appropriate processing centres and back with instructions to act or not, then back again with information about the action and so on.

When considering the selection process Cytowic (1993) also emphasizes the part played by emotion, adding that interest is formed and directed by previously acquired knowledge, or experience. Cytowic (1993) holds that the limbic system has the ability to determine value and relevance by its ability to act on incomplete information due to sharing pathways for different functions. This “is what leads to imagination and an aesthetic capacity” (Cytowic, 1993, p.191). The close involvement of the limbic system in the selection process explains more clearly the physicality of the ‘relations’ of James (1884b, 1890a, 1890b, 1894a, 1894b) that the emotional, feeling elements of a person’s system take part in selection, in meaning making from material presented by the senses (Cytowic, 1993).

The interrelationship of cognitive and emotive activity affects the processes of the brain, and thence the outcome of the creative process (Cytowic, 1993; James, 1894b). This link of emotion and cognition is particularly relevant in the sense orientated area of art making, and possibly explains why the most successful artworks communicate emotional and cognitive knowledge in tandem, combined in an amorphous, interrelated, interconnecting whole experience, reflecting a similarly integrated making experience. Perhaps the most successfully communicative works reflecting the most whole person (Brown, 2000). The whole is more affecting than the sum of its individual parts, because all the parts are not simply added together, but are interacting, each influencing the other in a self-organizing whole, thus reflecting the identity of the artist concerned.

Cytowic (1993) refers to the limbic system as the emotion processing system of the human body. It has a central area of ancient relevance to the human body situated at the amygdala, and limbic activity emanates from there to encase and control the nervous system. It is described as having developed from the ancient area of the brain involved in controlling flight or fight. Such close physical connection between limbic and neural processing could explain why it appears that the two cannot be successfully divided in
experience, as they even appear to share pathways for various functions (Cytowic, 1993). Whether evolution is taking us towards physically combining emotion and cognition, or perhaps research is simply uncovering interactions that have always been with us, emotion is shown to provide motivation for all experience. Experience of external stimuli initiates emotional reactions. Within this cycle emotion provides a governing control over knowledge gathering, functioning as a biological imperative (Cytowic, 1993). Ledoux considers that human evolution is moving towards cognition and emotion working together (Ledoux, 1998; Ledoux and Hirst, 1986). This theory is based primarily on evidence provided by research into brain activity that increasingly shows evidence of connectivity between the cortex and amygdala, the areas of the brain involved in processing cognition and emotion. It is indicated therefore that the limbic system must play an important part in the analysis of incoming information to the brain from the senses.

It is also relevant to consider links between emotion and cognition in the search to find a phenomenon that acts as a bridge between physiology and consciousness of self. The neurological solution to this problem may be found in the interconnecting processes of thalamus and cortex. It is believed to be one of self-regulatory feedback that appears to operate control over the flow of information available to the cortex. It acts to be inhibitory or excitatory towards incoming information, and seems to operate in relation to consciousness (Jones, 1996b). This is the likely link between the limbic and cortical activities, in a balancing activity involving emotion and cognition (Cytowic, 1993; Stones, 1966). This possible link emphasizes the importance of considering the interrelationship between emotion and cognition, implying that they may not be separated in any human activities, as the selection process necessary in all human activities relies on emotional consideration before cognitive reactions occur. Hence the vital role that is played by the emotions in the selection process.

**Emotion and Artistic Knowing**

“the emotional, heuristic mind, is the man behind the curtain and the one really in charge” (Cytowic, 1993, p. 185).

The question that is important for this dissertation is, what part do emotions play in artistic creative knowing? Is the link between emotion and cognition a vital one for the art making creative process, as suggested above?
In relating emotion to thinking Wallas (1926) refers to Hobbes, who in 1650 wrote of his belief that regulated paths of association of ideas were led by the thinker's feelings. Spinoza (1632-1677) put forward a theory of mind that includes categorization of the emotions under forty-eight headings. These categories are complemented by Spinoza’s consideration of control of the emotions, emotion versus, or controlled by, intellect. He strove to explain the balance of emotion and cognition, with reason as an ‘emotional force’ inherent in human interaction with others and with the surrounding environment (Hampshire, 1967; Warren, 1987). Warren (1987) summarizes Spinoza’s “model of man and mind” as one wherein an individual existence is dependent on a “tendency to self-maintenance, self-perseverance or preservation in one’s being”(Warren, 1987, p.9). This idea, drawn from the philosophy of Spinoza, stresses the interrelationship of aspects of mind, which include emotion and cognition as complementary elements, and thence control of emotions may be felt to exist in cognition, “passions are thought of as transitional states to be overcome through the development of clearer ideas about their objects” (Warren, 1987, p. 10).

Poincare (1914) also felt that the association of ideas was due to an instinctive emotional drive, not voluntarily controlled. He used the concept of 'sensibility' as the selector of trains of thought, and mentioned emotion as a frequently directing force in the association process (Wallas, 1926). James considered that mental states reflect varying degrees of knowledge. He felt that this knowledge may contain varying cognitive levels and feeling levels, but that feeling is definitely a way of knowing, of equal value to any cognitive awareness (James, 1884a, p.18). James felt very strongly about this issue and wrote on it further, as did Lange who worked separately, in Copenhagen (James, 1894b). In fact, in 1884 both James and Lange developed and published the same theory of emotional consciousness independently of one another (James, 1894b). Controversy was aroused by this theory that sought to find a physical basis for emotion. Previous theories, according to James, had developed a seemingly limited psychological explanation of what something feels like, but not how it happened (James, 1894b). In his theory of the physiology of emotion James assumed that “currents from the periphery” of the brain caused neural processes to serve both intellectual and emotional states. Physical reactions were seen to initiate emotional reactions. His detractors argued against this concept and James wrote an article in reply in 1894 with a short description of the theory wherein he considered that the “whole of
my consciousness” is mediated by organic sensations, “This is the length and breadth of my theory” (James, 1894b, p. 524).

Dewey (1894, 1895), writing in defence of the James/Lange theory of emotion compared their theory of the nature of emotion with Darwin's principles regarding emotional attitudes. Darwin believed acts or movements of expression depend on emotion. Dewey points out that expression is an outward manifestation detected by an observer, but movements are simply acts capable of various interpretations. The existence of the acts dates back in evolutionary time to their use in survival, reflecting behaviour developed in the service of life, not necessarily developed to serve emotion. Dewey (1894, 1895) believed that survival and serving life are the basis for the development of habits and attitudes developed from emotional experience; which takes us back to the importance of experience. Emotions reflecting back onto action initially developed to achieve practical results. From there expressive movements developed as a social demonstration of gesture and sign in the struggle for survival. Therefore expression is related to emotion, which may then be considered to be emotional expression.

Dewey thought James to be dealing with the feeling part of emotion, for example of being angry, rather than the state of the emotion, its quality of feeling. Dewey defined this as the concrete reverberation of organic changes, due to motor responses to outside stimuli. He considered that an emotional experience always had its intellectual or objective content, that is, the emotion n is always 'about' or 'toward' something, coupled with its particular quality (Dewey, 1895).

According to James, an emotional experience is split into three parts:
1 - An object or idea acting as a stimulus.
2 - A mode of behavioural discharge of the stimulus.
3 -The Affect - emotional excitation as a result of this discharge (James, 1884b, 1894b). Dewey felt that these three parts happen synchronously and spontaneously and that there is only one process, involving the whole person (Dewey, 1895).

Rugg (1963) supports the view that emotion shapes the 'imagination' in a feeling/thinking continuum, and that what a person needs most will determine how they feel and think, in other words: “Behaviour is drive motivated” (Rugg, 1963, p.223).

There seems to be substantial support for the interactive, integrated view of the functions of emotion and cognition, as co-functioning, co-evolving activities (Cytowic,
Wallas (1926) felt that instinctive emotion 'powers the machine' of intelligence or reason, whilst Damasio (1999) agrees that the stream of conscious discussed by James is linked to emotion, to our feelings for the images we perceive. He argues that emotion and consciousness tend to be present together or absent together, a claim that is received with some question by Baars and Mosca (Baars, 2000; Damasio, 1999; Mosca, 2000; Redding, 1999). Baars (2000) makes the interesting comment that the etymology of 'emotion' is 'to move out,' and that it has the same root as 'motivation.' Both related words are concerned with our emotional 'moving' or being 'moved,' and it is common to hear people talk of being 'moved by their emotions,' implying an emotional direction of cognitive processes.

In reference to interest and selectivity there arises what appears to be a different concept to that of full emotion, such experienced in anger, fear, love. It is one that captures a less intense dimension of sensitivity, a 'sensed feeling'. On the connection between affect and thought, Poincare believed sensibility, or feeling, to be the selector of trains of thought (Poincare, 1914). Such a felt sense may well reflect awareness of an emotion about something, awareness of the relations between thoughts and emotions. It may be that these feelings that are involved in decision-making, in selection comprising an awareness of links between concepts, caused by emotions felt about the cognitive element (Ellis and Newton, 2000; James, 1884a, 1884b, 1894a, 1894b).

Wallas (1926) considered that sensitivity to this awareness of feeling is retained from the ongoing stream by the process of concentration on the sensation that triggered it, rather than on the affect, or feeling, itself. This is close to the experience of awareness of the fringe of consciousness, mentioned by James as reflecting relations with other connections not part of the current focus (James, 1884a). Wallas (1926) advocated developing an awareness of these 'fringe-thoughts,' commentimg that it is often important to stop what you may be doing in order to note down the idea that has emerged unbidden whilst concentrating on the area of focus. He describes a system of note making running concurrently with work in focus in order to capture these transient thoughts. This is a habit of work in use by many creative people. The artist involved in a process of art making is, however, continuously in this state of contemplation, which consists in the cycle of selection of ideas from the flow, their concrete interpretation, followed by selection, and so on, melding into a continuous process of making.
Emotion relating to the selection process appears in particular to relate to those elements that have been referred to as qualia, the experiences that offer the quality of an object, those that are decided by individual feeling perceptions of the world. Qualia is a term used for example, by Dewey, to denote the feeling about a thing, perhaps a beautiful flower or a spectacular landscape (Dewey, 1894). Art has always been connected with feeling, sometimes thought of as beauty, the commonly called 'aesthetic experience'. But how do we experience this feeling?

Perhaps this marks a return to James (1909), and the understanding that he offers that it is the relations of thought, the feelings they generate that imbue the objects of thought with meanings, feelings of "qualities in relation" (James, 1884a, p.10). There is just one passing thought of a whole object that contains a feeling of a thought about a thing. Such a feeling cannot recur, as change is continuous and if the feeling returns it will be seen differently due to the changed subjective state. A feeling is of the object "in-those-relations" at one moment in time in particular (James, 1884a, p.11).

The Self

Bergson (1913) saw art as knowing through the effort of placing ourselves at the heart of the subject, and that at the heart of this is intuition, which he also described as "intellectual sympathy," a combination of feeling and thought (Bergson, 1913, p.7). This description of intuition as a combined cognitive and emotional activity and an integral element of art making relates to the previous discussion on emotion and cognition. In keeping with the frequently mentioned topic of change in this study, Bergson (1911, 1913, 1946) explains that intuition is "not a thing, but the direction of a movement," a passing reality (Bergson, 1911, p.77). In order to understand the process of intuition he considered it to be important to understand the individual personality, the self, and stressed the need to know its values, and its directions. The personality cannot be constructed in a mechanical way. There is an emphasis in his ideas on 'becoming,' the element of continuity of thought and human activity later emphasized by Prigogine and Stengers (1984) in relation to Chaos theory. This approach represents an integrative way of viewing the self in a state of constant change.

Bergson (1913) found himself in opposition to the current theories of his time; for example those of Pavlov and his behaviour based theory of conditioned reflexes. This was because he combined ideas from three centuries of scientific exploration into
the basic concept that is now at the root of the theory of non-linear dynamics. This is the concept of motion, of change and growth, of making and becoming, as opposed to static concept of ‘being.’

Such work relates to the importance of links between foci and the fringe activities and relations discussed by James (1890a). This connecting force is governed by the strength of stimulus, by the degree of connectivity and the level of chemical receptivity of neurones. One significant question that follows is, what controls this chemical activity? What is the ‘self’ in self-consciousness?

The involvement of the ‘self’ is an element of consciousness that governs the activity of the artistic creative process, as it is a process regarded as individually orientated. Jones (1996d) in asking questions about the ‘self’ and conscious thinking, points to the fact that with all the knowledge of human physiology now available we seem still unable to tie the 'mind' into the brain. This is referred to as the ‘Hard Problem’ (Jones, 1996d). It is still the vexed question of where subjectivity comes from, or resides. Who or what is the ‘self’ doing so much self-organizing? That there is no longer credibility in a belief in the homunculus, or little man in the brain orchestrating our every move, is verified by research into brain function, which has so far definitively isolated no single area of the brain in sole control of the processes of the brain (Jones, 1996d). Instead the self is understood to be an integrated, self-organizing biological process, such conclusion again appearing to give credence to the view of a ‘whole body’ involvement in knowing.

In this last vein, a biological explanation for cognition is offered by Maturana and Varela (1992). Piaget (1971) also spent a lifetime exploring ideas relating to the biology of cognition, seeking understanding of the processes involved. More recently Searle related consciousness to a biological source, and at the Second Tucson Conference on Consciousness gave his version of “The Commonsense definition of consciousness” as “Subjective qualitative states of awareness, sentience or feeling,” that is, “A biological phenomenon that is intrinsic to certain biological systems” (Searle in Jones, 1996d). Searle's description of conscious relates to qualitative states, open to interpretation, and personal representation based on individual biological status (in Jones, 1996d).

In answer to the problem of the identity of the ‘self,’ Jones describes patterns of data stored in the brain, comparing this concept to P.M.Churchland's vision of patterns
of activation (Jones, 1996d). In this explanation the contents of consciousness are regarded as a representation of the dataflow within the brain. Jones (1996d) concludes that in his view the most difficult concept to accept is that "all we need to be conscious" is the flow of data through the complex system of body and brain "with all its reverberant activity," and therefore, "I am the dataflow" states Jones (1996d).

This is not a new concept, as McDermott (1977) refers to James's emphasis on consciousness as a function rather than an entity. Combs (1995) also considers that we are our own processes. And so it seems that the 'self,' or self-consciousness, may reflect the unity of interconnected processes contained within the human organism. In relation to the creative process of art making it lays emphasis on the autopoietic structure of the creative process of each individual and a reaction to events that involves the whole person.

**Self-Organization and Knowing – the Biology of Cognition**

The self-organization discussed previously applies to the organization of energy flow in natural living systems, including that of knowledge gathering. Maturana and Varela (1992) offer answers to both of the questions, 'what is a living system' and 'what is cognition'? At its core is the belief that: "To live is to know" (Maturana and Varela, 1992, p. 174). In an extremely influential major theoretical work in the philosophy of science, Maturana and Varela (1980) together developed the concept of autopoiesis to explain the biological process of self-organization that they found to be the basis for growth and change in organisms. Autopoiesis is a term created by Maturana and Varela (1980) as a new formal linguistic term needed to summarize their concept of the circular organization of the living organism, the central feature of which is its autonomy. Maturana invented the word autopoiesis. He chose 'poiesis' as he had a profound respect for the power of its meaning, which is 'creation'. The addition of 'auto' made it a new word whose meaning could be freshly created. It was a word he felt could adequately represent "the dynamics of the autonomy proper to living systems" (Maturana and Varela, 1980, p. xvii). It has become a well-accepted formal term, used widely, particularly in systems theory, where its relevance is found in describing the basic structure and function of self-organization.

In writing of autopoiesis and cognition, Maturana and Varela (1980, 1992) have created a deeply insightful vision of cognition as a biological phenomenon. They
propose that a biological basis for the gathering of knowledge may be founded on the interaction that occurs in the single cell, which is the simplest form of organism. The cycle of activity within the cell, or unity, provides an environment for a balance of cell metabolism, of chemical components in a dynamic relationship. This is held within the boundary membrane which itself functions as part of the dynamics of the continuously active cell, but reacts to confine the cell's activities within a unity of form. The immediate outer environment of the cell, the domain in which it exists, is linked to the cell by interaction through the cell's boundary membrane. This allows chemical and electrical exchanges of material to be made between the cell and its immediate environment. Such interchange can lead to the absorption or rejection of new exchanges. Absorption into the cell's formation leads to its growth and change, within the limitations of its internal structure. Change in this structure may also occur, but the original structure is still an integral basis for this change, otherwise the cell will disintegrate (Maturana and Varela, 1992). Cells interrelate through 'structural coupling' whereby they maintain their own homeostatic states, but exchange mutually acceptable material. In this sharing process they grow along a mutually concurrent path, called a 'structural drift'. This activity occurs between two or more autopoietic unities or between a unity and its environment. They trigger changes in one another, but symbiosis may occur when the boundaries of coupled unities are absorbed into one (Maturana and Varela, 1992).

This self-organization, self-creation process explains how growth in an individual direction may occur, and how knowledge is gained biologically, being absorbed into the structure of its existence. Cells are capable of encouraging or inhibiting growth and change in their structure. As Maturana and Varela (1992) continually emphasize, if it is born in mind that at the basis of all biological processing is a single cell, with certain properties, then it all makes sense. The whole system of unities when envisaged as a complete autopoietic unity is the same in principle as the single cell viewed as an autopoietic unity. All component parts interact within systems of organization to form a whole within a boundary. This applies to all natural systems, reaching out to the cosmos and back to a single cell (Davies, 1987).

The concept of autopoiesis emphasizes that growth and change happen with the input of new information. Knowledge is something that happens to the organism when it accepts or rejects incoming information in the form of particular electrochemical
activities. If accepted the 'information' becomes part of the organism, part of its structure, which determines future action and behaviour. In this view of knowledge gathering knowledge is not simply absorbed or rejected, or stored on a shelf of the mind like a row of books (Eisner, 1999). It becomes part of the organism's neurological response to the continuous bombardment of stimuli from the outer environment. This is where the true embodiment of knowledge is to be found, in the basic human cell formation and its function, and in the linking interaction of all cells, including the incredibly specialized areas that have developed in the human body (Delcomyn, 1998; Maturana and Varela, 1992).

The dynamics of the cell are such that division takes place as part of the cell's autopoiesis and its normal structural change. Cellular fracture in the reproductive plane causes self-replication. This results in a self-similar independent product although each of the cells when forming "receive different components from the original unity which are not uniformly distributed but are a function of its individual history of structural change," its ontogeny (Maturana and Varela, 1992). This is the beginning of a genetic history because if one copy is copied and then that one copied in turn, and that is further copied, then the changes that inevitably occur each time cause transformations from the original, thus creating an historical lineage, and an historical drift. This is because when the copies of copies are formed they receive different components from the original that are unique, and comprise its individual structural change. They are historically connected in a system of generational changes. These dynamic historical mechanisms of structural transformation provide a biological explanation of the phenomenon of cognition. The nervous system participates in cognitive phenomena through expanding the realm of possible states of the organism. These arise from the multiplicity of sensory-motor patterns of the organism, and by association of internal states with the outer interactions of the organism (Jones, 1996b).

The cycle of a dynamic system is determined by its structure, the structure is in a state of self-organizing ongoing change, and so is its structural domain. Ongoing structural change is the dynamic of life itself, because the environment affects structural change in organisms and the organisms affect the environment. This is a cycle in which structural coupling is always mutual and leads to the structural drift of both organism and environment. There is stabilization of change when it happens slowly, whereas sudden change leads to diversification, "living beings function always in their structural
present" (Maturana and Varela, 1992, p. 124).

From a neurological viewpoint we exist in the temporal linking of neurones, in ‘real-time’ (Maturana and Varela, 1992). We are a mass of electrical impulses that are constantly jumping synapses, moving extremely fast, according to a variety of rhythms. The organism in its environment is variable in its dynamics, because it is experience affecting, thereby constantly modifying its whole structure. The cognitive process is tied to a growth of knowledge developed in this way, because learning is an ongoing structural drift, happening as a result of structural coupling of organism and environment. Co-ontogeny between separate organisms occurs when they adapt through reciprocal structural coupling. Groups of people have their own boundaries in a social co-ontogeny of components, and this is presented as the biological basis for cultural phenomena (Maturana and Varela, 1980, 1992). It offers a biological explanation for the comments on the effects of experience discussed above under the heading ‘Knowledge from Experience.’ It explains the process of teaching, the communication of knowledge between people through the means of structural coupling.

The biological explanation of cognition specifies that the functioning of the human body should be viewed as a whole, seen as a complete interrelated functioning system consisting of self-contained unities (Maturana and Varela, 1992). Living systems are characterized as autonomous, self-referring, self-constructing systems. This is the character of dynamic self-organization, a theme held by Chaos Theory as one of its basic tenets (Combs and Goerner, 1997; Davies, 1987; Hayles, 1991; Montuori, 1992).

The dynamic character of consciousness and its evolved complexity of performance indicate an openness of flexibility and capacity for transformation that proves the success of this particular evolutionary stratagem (Goertzel, 1993). The potential of its growth seems endless, within such a self-organized system. The organization, through the multiple feedback pathways of the brain, is dictated by the needs of the living system as a whole. These needs are inevitably directed towards survival of the individual, and possibly of humanity as a whole, and further, the living planetary system. It is sometimes necessary to take an extremely large step back from the activities of mankind within its contextually complex environment to understand the total picture of such interaction. Scientific exploration of space collects photographs of the Earth that give a distant perspective on the patterns of gases, of which the chance
chemical formations of our bodies and minds are constructed.

On a larger scale, Davies (1987) believes that the organizational complexity of the cosmos increases with time, and the creative activity of nature is the continuous self-organizing process fundamental to life. This natural creative process underlies the universal process of growth and change, and as art makers we are all small-scale reflections of this over-all pattern, self-similar in process. We are small parts of an interrelating whole, our smallest atoms reflecting the activity of larger scale constructs. Like human walking Mandelbrot sets we have our own individual patterns of growth that relate to those of the whole of nature.

It’s an experience like no other experience I can describe, the best thing that can happen to a scientist, realizing that something that’s happened in his or her mind exactly corresponds to something that happens in nature. It’s startling every time it occurs. One is surprised that a construct of one’s own mind can actually be realized in the honest-to-goodness world out there. A great shock, and a great, great joy (Leo Kadanoff in Gleick, 1987, p.189).

The ambiguity presented by at first separating the creative process into stages, and then attempting to envisage them as an interrelating whole provides a chaotic problem. An answer is to visualize the stages as elements of an autopoietic system wherein the activities that seem to be separate are in fact interactive parts of a whole. The complete system of knowledge processing through creative process may then be viewed as a large component of the whole functioning system of the artistic creative process that culminates in a finished piece of artwork.

In order to hold the holistic character of the creative process in mind, and in keeping with Chaos Theory, autopoiesis may be taken as a structural definition of information processing in the creative process. It provides a holistic view that allows incorporation of those elements affecting the creative thinking process, such as attention, reflection, emotion, context, tension and experience, all elements that are dealt with in more detail elsewhere in this study. These main elements, all of which interact in an autopoietic way, are each reliant on the other for its function within the whole dynamically interrelated process. All are seen to contribute to the artistic way of knowing in a circular dynamic functionality, interrelated, interconnected and ‘chaotic’ in their relations (Hayles, 1991). A discussion of the biological dynamics of cognition
explains this interaction, and it is possible, on this basis, to extract and explain particular aspects of the process that contribute to the whole (Maturana and Varela, 1992).

**Tension**

Incubation is described above as a structural stage of the creative process, occurring when incoming information is compared to that previously acquired and either stored in the short term memory as reference to fresh knowledge, combined with related ideas to create new understanding, or rejected. While this process is happening a state of tension develops (Ghiselin, 1952). Arnheim describes the tension in creative process as a human effort to balance the dynamics of personal needs with those of the environment in creation of “the most harmonious pattern” (Arnheim, 1954, p.423).

Read (1964) considered the creative process to consist of balancing reciprocal tensions of abstract concepts, balancing such opposites as realism-abstraction, or life-death positive and negative forces. In an effort to achieve a balance, artists’ freedom of expression leads to the creation of a new reality. Read believed that this is the way to explain evolutionary developments in human consciousness, and spiritual growth (Read, 1964a).

In art making, the tension created by the relationship between conscious and preconscious is described by some commentators as attention oscillating between the two states (Havelka, 1968; Mumford, 1998). The mental tension so created is described as achieving a new integration of elements from the two processes, thus ending the tension. A description of this process is provided by Koestler (1964). In an analysis of the process of creativity he drew diagrams illustrating the tension of a creative mind wrestling with a problem, and reaching a stage he called 'bisociation'. In these diagrams movements of the mind are shown to follow successive loops across a plane, tracing accustomed routes in a search for solutions to problems. Eventually the tension created by not finding an answer, and input of perhaps a very small nature, forces the mind to travel to another plane, thus creating links which will form a new order (Koestler, 1964). This relates closely to the Chaos Theory concept of edge of chaos and bifurcation.

Witkin (1974) described this edge of chaos situation as the 'holding form,' something to mentally hold on to until the idea could be captured. It is the same state of mind as the deep involvement described by Wolseley and Pollock above. There are
varying forms of tension experienced by each individual. To hold on to the passing thought a deeply focused concentration of attention leads to an awareness of the fringe of ideas floating around the thought, and the structure of the thought may stay as long as it is held in its potentially transient thought domain. There seems more chance of revisiting a similar thought if its relations are held in the controlled tension that develops through deep concentration (James, 1884a; Witkin, 1974).

As a fundamental stage of the creative process of both artists and scientists, Briggs and Peat (1989) described the tension between chaos and order. In this way a sense of order may be created or destroyed by the flow of energy caused by the dynamics of self-organizing systems and their interaction of parts, within their individual fields or domains of activity. In this case it is an activity – creative process - taking place within the domain of art making (Briggs and Peat, 1989; Newton, 2001; Prigogine and Stengers, 1984; Urban, 1995).

In constantly creating a new reality, the artist is aware of oscillation between states of consciousness and this causes a feeling of tension, inspiring speed of work in order to not lose the ‘train of thought,’ the continuous ‘flow’ of ideas (Csikszentmihalyi, 1990). It seems that these 'transitive' parts of the stream of consciousness might represent the brain focusing and linking its networks, and that incubation is the time taken for the links to be made to the albeit ever changing attentional focus; the fringe or noise float around the focus, all interacting in a constantly flowing stream held together by interconnected tensions of connections.

Urban (1995) emphasizes the need for keeping a working system in a state that is far from equilibrium, considering the tension between parts to be the main dynamic of the creative process. This is in order to facilitate fast interactions, because it provides “easy, direct, and fast access to all possible 'attractors' or nodes” (Urban, 1995, p.150). The attractors or nodes in the art making process are those same peripheral related half-thoughts hovering on the edge of realization, on the fringe of the stream of thought that were discussed above (James, 1890a). Artists work constantly with these skills (Hawley, 1993). Whether they are painting a portrait, drawing moving water, or creating a design, images and ideas move constantly through the mind seeking assessment and selection.

The felt sense of tension created at the beginning of art making by the process of preparation is enervating in its open readiness to explore fresh directions. This is a
consciously felt sense of temporal preparedness. The flow of ideas is free running when there is, as Isadora Duncan reportedly described, “a state of complete suspense (Ghiselin, 1952, p.5). It is a feeling of freedom, like an adventure going into the unknown, not on the periphery of consciousness, “but rather implicit in the whole spread of the subjective life...a yielding to oceanic consciousness” (Ghiselin, 1952, p.5). This is not a step-by-step, stage-by-stage, process, among visual artists, but rather a multidimensional one, where the artist works within a system of constant reassessment and balance of all component parts (Havelka, 1968; Urban, 1995). There is tension between all parts of this system and that is the dynamic of the system. It is the balancing act between conscious and preconscious states, working on the ‘edge of chaos’ until a sudden clarity of understanding that sometimes produces the trance-like equilibrium during which an artist makes a statement, before the transient nature of the thought itself affects a change in the process.

Artists tend to work within this state of tension, on-the-edge as it were, prolonging this state of mind by deep concentration, controlling the process in a self-organization way (Kohler, 1940; Krohn, Kuppers, and Nowotny, 1990). Attention and concentration would appear to be linked in a state of tension, creating a build-up of energy in an effort to reach a homeostatic level within the artist. Alternatively, the energy may prove too great, the tension in excess, and the situation move towards bifurcation and a move into different directions. On the other hand, disintegration may occur, through too much rebalancing until a homeostatic level is lost and an entropic breakdown ensues, when the artist may throw away the work and start again (Arnheim, 1971). This subject is also discussed earlier in relation to Chaos Theory.

When new ideas crystallize a realization forms that is a conscious mental experience. It may be accompanied by a feeling of illumination, or sudden insight, when the tension created during the incubation stage is broken, and understanding or new meaning emerges (Briggs and Peat, 1989; Koestler, 1964; Peak and Frame, 1994). Arnheim, (1971) also writes of the cosmic tendency towards order and simplicity providing the driving force for creativity in a search for homeostasis, and a state of equilibrium. The striving for balance and homeostasis leads to change and growth, because there is inevitably at some stage a small invasion of the homeostatic state that affects its balance, changing the internal dynamics of the particular unity. This may be dealt with and absorbed internally, but it has the capacity to cause such an imbalance
that there is a build up of tension. This is only broken when the edge of chaos, the threshold of change, is reached, and bifurcation occurs, when new directions appear that may be followed. Tension is provided by the state of imbalance that is the dynamic of a non-linear system such as that of the creative process.

Arnheim (1954) points to the need for similar interacting balance of dynamic forces to be found within a work of art for it to be successful. For example, when discussing colour he points out that those which are mixtures of various quantities of two or more colours produce more tension in a painting than do pure colours, which do not interact with one another in the same way, and consequently have restricted dynamics.

The artist Francis Bacon reflected appreciation of this situation and showed that he understood his own creative process and the vital part played in it by the affect on tension of the slightest change in circumstances. In an interview with Sylvester (1993) Bacon said that, “Art is the link between conscious and unconscious activity - the tension can change by the way the brushstroke goes on” (Sylvester, 1993, p.29). This quotation reflects the subtle sensitivity of artistic awareness whilst art making and the sense of balancing tension that is the aim of art making at this time. Whilst a brushstroke is controllable to a large degree, it may still provide a surprise, extended when combined with the myriad possibilities offered by the status of the paint. There may be a slight change in intonation of line, tone, texture, or colour, thereby placing the artist in a situation of working in the present, in the reality of the ever changing moment, where it is necessary to make decisions as things happen. The influence of sensitive dependence on initial conditions could not be felt more strongly than in this situation. The sense of rapid change is intrinsic to the creative process of a practising artist performing “complex evolutions through time” (Hayles, 1991, p.27). An artwork is something that evolves as it is made, and art making is an evolutionary creative process.

**SUMMARY**

The foregoing discussion has been wide ranging and canvasses ideas and understandings that are themselves emerging in specific domains of research and scholarship. Yet, these ideas and understandings are remarkably resonant for thinking about what is going on in art making. Moreover, they underscore the type of perspective most fully captured in Chaos Theory, as it offers a view of the artistic
creative process as one comprising interrelating elements rather than individually separated sequential stages. The activities that are recognized as interacting during the art making process may be viewed through Chaos Theory as structural elements of a self-organizing process that are open to constant change.

The interrelated structural elements of the creative process comprise *immersion* in *preparation*, and *incubation* of information received during *immersion/preparation* with that acquired through previous experience. These structural functions are found to relate to states of consciousness, incorporating self-consciousness, processing information primarily involving neural interactions at a level below consciousness. This activity is caused by tensions that are created due to emotional input in the selection of material receiving attentional focus. They also incorporate domain and other contextual considerations. The main functional elements of this autopoietic process appear to be attention, emotion, concentration, selection and focus.

The artistic creative process that was earlier viewed as one that consists of a number of consecutive stages may be better viewed as a biological system of growth and change; one in which immersion in information sets off a chain of interrelated events in which the whole person takes part. The importance of concentration, of keeping an open mind, and an appreciation of processual flow, all contribute to the creative system of growth and change.

The phenomenon of knowledge is rooted in the very organization of the living organism, in the living being as a whole, in its autonomous system organized through each individual's varying autopoietic structural history. Knowledge is the ongoing structural change that is the biological dynamism of life, based on the ontogeny of the individual. The relevance of a biological theory of knowledge gathering for art making, and art teaching, is that it verifies the validity of art forms as a means for people to interpret their world, because this is a natural process, and as such is available to all. If the artistic creative process is in turn seen as one of human information processing, then its validity as a means of communication is further justified, as would also seem apparent from its centuries long use. The whole would appear to be a continuous autopoietic process of reflection on life.
INTERREGNUM ONE
AN INTERIM SUMMARY COMMENT

It appears have been accepted by early literature on the topic of creative process that there is a period of preparation or immersion in information by the artist, which is essential to begin the process. Next followed incubation of this information, a time of comparison and creation of interaction between the new and that previously processed. This led to an emergence of inner understanding translated into artistic interpretation. However, it may now be understood that the activity of art making is a continuous process that involves concurrent interaction of these components and it is not a stage-by-stage process. There are so many influences on this process that it is best viewed as a fluid activity, subject to continuous change in every way as the making progresses, under the control of the individual artist. Work progresses by selection of a point of focus within the process, and is ever changing with the progress of the work. There is a sense of balance reached on completion of a piece of work from which an artist moves on to the next, or, if not satisfactory, the work may be suspended, still leaving the artist with motivation to move on. Each art making activity captures the uniqueness of a transitory experience. There is a need to recognise indeterminacy in the art making process, to allow the freedom for people to reach out and extend themselves within their own structural boundaries, seeking meaning.

Art making is a creative process that is individual in character when considered in relation to different persons, but consisting of universally recognisable although infinitely variable elements of activity. These elements are the interactive, interrelated, interdependent aspects of the self-organisational artistic creative process.

A linear interpretation of this activity is limited and inappropriate due to the continuous interaction of interdependent elements within the creative process. Analysis consisting of deterministic cause and effect, leading to precise prediction and control over future events, does not apply in the case of the creative process where the prediction of outcomes is not anticipated, but meaning may be found.

The theory presented in Part A suggests that Chaos Theory provides metaphorically appropriate concepts, that when applied to models of art making (as in the diagrams above illustrating iterative possibilities) best describe the interactive, interconnected nature of the artistic creative process, reflecting order emerging from a
complex non-linear system. Art making may be seen as an emergent property of the whole person that serves as evidence of the combined interactivity of brain and body that is represented by the knowing and meaning found in mind that is exhibited through art making. Advanced thinking in neurology and neuropsychology, related reflections on the nature of the self, and understandings of emotion and cognition, coalesce in an understanding of creative activity which is itself perhaps the epitome of the understanding that all this thinking has to date generated.
PART B: AN EMPIRICAL INVESTIGATION TO TEST
THE GROUNDING OF THE
THEORY OF PART A
IN PRACTICE
CHAPTER FIVE
OBSERVING ART MAKING PRACTICE

Discussion of theoretical aspects of an understanding invites an empirical consideration of the creative processes of practising artists; even if, at the same time, it points up both the difficulty and possible contradictions involved in such an approach. This said, the empirical study is intended to address the creative processes of a number of individual artists as it actually occurs. Information gained in this way will extend the theoretical study, adding relevant empirical knowledge, thereby anchoring theory to practical subjective experience. It is intended as an open study of artistic creative process that asks questions about artists’ experience of art making. The interpretation of this information by the researcher is in the form of a synthesis that aims to offer a balance and counterbalance of ideas gained from both the theory of Part A and the data gained in this part. In this way the researcher be seen to play the part of her own ‘devil’s advocate’ by offering the opportunity for information to emerge that may not support the theory of Part A.

Aims and Function of the Empirical Project

The overriding aim of this thesis is to clarify how the artistic creative process functions, particularly in relation to the insights provided by Chaos Theory, and to consider any resulting educational implications. Recognition of the value of empirical research for this project evolved from consideration of the research that is discussed in Part A. For the most part, that research is theoretical and suggestive and, while it is not thereby of less value, an attempt to support the theoretical with some empirical observations appeared to be a highly desirable goal. This empirical section of the study is thus playing a supporting role in the overall study, augmenting rather than validating. It therefore forms the second part, Part B, followed by a third part, Part C, which connects parts A and B, linking the initial theoretical discussion with the observations drawn from the empirical study. In turn, Part C draws out the educational implications and the significance of Chaos Theory concepts in art making in an educational context, and for art teaching generally. This empirical study may demonstrate the usefulness, or, alternatively, point to the inadequacies of Chaos Theory concepts when discussing art making and art education.
Chaos Theory provides a suitable structure for understanding the artistic creative
process as the activity of a non-linear system. Illustrating through empirical reference
the appropriateness of viewing artistic creative process as a non-linear system may aid
in elucidating how the process actually works, perhaps why it happens the way it does,
and how it relates to all other natural human processes (Koestler, 1964, 1981; Warren,

As previously considered, there is a great deal of literature regarding the creative
process as a set of stages (Ghiselin, 1952; Koestler, 1964). To summarize from the
literature review in Part A, the creative process is accepted as consisting of the
following stages:

- *immersion* in a topic, through acquisition of knowledge,
- *incubation*, or *reflection* on the topic,
- *illumination*, a new understanding relating to the topic, and
- *interpretation*, or *verification* of the new knowledge.

In the previous discussion the two creative process stages of *immersion* in information,
and the *reflective* stage of *incubation* appeared to emerge as essential to the process.
These are the stages that will be of particular interest here (Emerson, 1991; Goerner,
1995; Hayles, 1991; Urban, 1995), and the empirical research aims to bring these
analogies more to light in exploring the individual creative processes of a variety of
artist participants. The literature indicates that these areas are the most significant
aspects of an artist’s creative process (Csikszentmihalyi, 1996a, 1996b; Ghiselin, 1952;
Havelka, 1968; Rugg, 1963). Therefore they are judged to be also important for this
empirical research, and possibly important in relation to teaching the creative process.

**The Problem of Research Methodology**

There is a variety of research methodology that could be applied in this enquiry.
Sullivan (1996), in developing an interactive research model for critical interpretation
inquiry to be used for arts education research has created a framework that provides for
both empirical rigor and diverse interpretation. This method does not meet the needs of
this project, however, as it is important to choose the form of qualitative research which
most closely portrays the “quality of the experience the author wishes to convey”
(Eisner, 1998, p31). In this case it is that of hermeneutical phenomenology, because this
addresses the needs of the purpose of the project, that is to examine what it is really like
to experience artistic self-expression as reflected in the artist’s creative process (Van Manen, 1977, 1990). Hermeneutics as an approach to interpretation of meaning and understanding involves complex and non-linear considerations, similar to art making. In this research there is an assumption that personalities, processes or occurrences are complex and meaningful phenomena, and that interpretation in this kind of research will be open to revision, as data is collected and analysed. Chaos Theory concepts allow access to the interconnection of parts of a complexly structured system, which is constantly changing and reforming, thus enriching this meaning making exercise (Bolland and Atherton, 1999).

In such a project the researcher is totally involved in a research situation as participant, using the self as an instrument of research, required to have a sense for that which is specific to the topic, and working within a framework which makes the search significant (Eisner, 1998). In this case synthesis pointers gleaned from the theory of Part A provide an initial framework for the data synthesis, with the researcher playing a key role in controlling synthesis and interpretation of emerging information and meaning. Eisner writes of the researcher finding the meaning events have for those experiencing them, through collecting “thick description” (Eisner, 1998, p35). The use of multiple data sources is seen as vital, acting as mutual corroboration of validity, and to gain as much understanding of the nature and meaning of the experience as possible (Van Manen, 1990). Therefore sources of data vary from one artist to another, depending on circumstances and availability or convenience of collection. For example, it is not always practicable to make field notes whilst taking photographs of a fast developing piece of work. In some cases they were added later, or not at all. This is in keeping with the character of the research topic, which entails open mindedness and incorporation of available information.

Therefore, although it was hoped that information may be found relating to the theory of Part A, the research nature of this study is phenomenological, allowing an open-ended attitude to possible findings, and emergent themes. This is particularly appropriate in this research topic, as each artist needs to be recognized as owning a different set of life experiences and understandings that influence their artwork, an individual total ontogeny. These dictate the complex concepts, form, and content of their work. At the same time, their creative processes are evolving continuously, requiring acceptance for this study of some seeming incompleteness of data in the
research, with some projects not resulting in finished pieces, but reaching a natural end nevertheless. It was initially anticipated that collection of data may need to stop according to an allotted time span for the research, perhaps at an unfinished stage of the artists’ works. However, there was ample opportunity to acquire information about how the artists’ creative processes work even though in one case there was no completed object to discuss.

The topic of artistic creative process is one requiring that the researcher retains the emotional and intellectual freedom to allow both research and reporting to unfold naturally (Moustakas, 1990). McTaggart (1991) also notes that for arts educators one of the most important products of arts education research is the kinds of things people produce as a result of the experience. This provides an incentive for the researcher to become involved in phenomenological research, as it is a method which allows the researcher deep immersion in the topic, allowing also the potential for creative interpretation as part of the report on the research (Van Manen, 1990). In connection with this please refer to the Afterword on page 272 for a commentary, and the accompanying CD to view some of the Researcher Interpretations relating to the creative learning experience of making this dissertation.

In summary, in order to extend understanding of the artistic creative process a series of in-depth ethnographic case studies have been conducted. A small number of participants were considered sufficient to acquire meaningful data from in-depth recording of observed experiences, and detailed interviews with participants.

Aspects of the Project

The smallness of the scale – six artists – is appropriate to the case-study perspective being followed within the broader research perspective, and to the role of this work in the overall work. The empirical study serves to address the creative processes of artists. Information gained in this way is intended to extend the theoretical study, adding empirical knowledge, thereby anchoring theory to practical experience. It may also yield independently of present contentions concerning Chaos Theory and, again, information regarding patterns of activity/behaviour connected with the artistic creative process, potentially informing art teaching at all levels of attainment.
Anticipated Results

The anticipation of results in this case appears to be antithetical to the nonlinear thesis being emphasised by this dissertation, and the qualitative character of the empirical research. This is because one may consider that to anticipate results would reflect the expectation of a particular result, one of cause and effect leading to the substantiation of certain suspected truths. Yet, while it may be expected that the observational study would show an individual pattern of artistic creative process, varying from one artist to another, an assumption is that there will be evidence of a common pattern of an accumulation of information, following a consciously chosen approach. There may be evidence of both conscious and pre-conscious immersion in the topic, shown in discussion or in the artwork. It is to be expected that the artists may show evidence of following tacit feelings about rightness of timing of stages of the creative process, seemingly instinctive. Evidence of continuous processing, punctuated by visually observable stages of rest, and others of intense concentration, signifying involvement in interpretation of illumination, all running concurrently in a seeming spontaneity of action.

Preparation for work would be expected to include preparation of the working environment. Furniture, tools, equipment and light need preparation. The artist’s state of mind, aided by music, quietness or meditation, needs to be consciously prepared in order to access a reflective state of mind (Austin, 1998; Csikszentmihalyi, 1997; Laverne, 1996).

Reflection on completed work may evoke some conscious surprise at its unexpected nature. Verbal analysis of finished work may be expected to relate results to the artists themselves and their experience of life, current conscious and other thought processes and current feelings and emotional status (Dewey, 1934; Eisner, 1985). It is possible for the research to find that a state of deep concentration whilst working is possible, where the artist cuts out complete awareness of surroundings, and yet is able to carry on conversation, to reach for tools, and technical needs (Stein, 1974).

As an ultimate result of the deepest concentration, the research may possibly report that during the artist’s process there is an awareness of a sense of oneness with the universe. A loss of a sense of being separate from the world, but instead being a part of the whole pattern of life, of connectedness, of participatory knowing, of spirituality and inner wisdom, and this providing a sense of freedom within which to work. At the
completion of a work the artist may exhibit a sense of urgency in their need to return to the process and experience again the sense of freedom and oneness (Koestler, 1964; Palmer, 1998; Polanyi, 1962).

The research may indicate awareness in the artist of the positive aspects of the social context of their work, and at the same time awareness of any constraints on their work offered by the social context (Amabile, 1983).

These anticipations are all consistent with the theoretical discussion of Part A that yields also a number of questions that can be explored in synthesis of the collected data. For example, one area found in the theoretical studies to be a vital part of the process involves the activity of the preconscious mind. It is therefore important to ask about the role played by the apparently differing states of consciousness in the artistic creative process. ‘How does the artist cue the preconscious, to begin a process of associational mechanisms leading to a development of insight?’ (Mumford, 1998) Or, is it possible for an artist to consciously anticipate their reactions due to understanding their own creative processes? Or, what part does the conscious mind play in artistic creative process?

Is it a search for universal answers, where it may be possible that the integrative model of Mumford (1998) discussed in Part A of the thesis provides the explanation for how an artist moves through different levels of consciousness whilst working? Does the model conceived by Csikszentmihalyi (1988) provide a better understanding of the process? Or does Chaos Theory better assist understanding of artistic creative process in providing a pathway for understanding that is open ended, as suggested in Part A. The results may indeed invite generalisation, or they may be seen to apply only to individual artists. All of these matters may be restated as more direct questions to be illuminated by this empirical project:

- What are the elements involved in the creative process of art making as experienced by each research participant?
- How does the artist become initially involved in their work?
- Is the acquisition of information essential to developing artistic creative potential?
- What is the connection between the incubation stage of the creative process and the mental state of reflection?
- What part does conscious decision-making play in the artist’s creative process?
What part do tacit feelings play in decision-making during art making?
Are there any patterns of process emerging from the data?
Does deep concentration play a part in art making?
Does awareness of surrounding environment fluctuate during art making?
Does awareness of social context play a part in the process?
Does awareness of personal context play a part in the process?
How well do artists understand their own creative processes?
Do the results of the research relate to Chaos Theory?

Despite the formulation of these specific questions however, the research perspective mandates that whilst these considerations may provide a starting point for synthesis, whatsoever other matters emerge both during collection of data, from observation, or during informal discussions with the artists, and on synthesis of all the information, these must all be receive equal consideration.

The Participants

The participants come from a variety of backgrounds that are described in detail in their Preliminary Interviews that may be found recorded on the accompanying CD. Four are university trained, but under totally different circumstances. TS finished a Batchelor of Arts Visual Art at Newcastle University NSW in textiles, and has worked as an activities officer at a nursing home. BB majored in Art History at the Courtauld Institute in London, worked in the Indian section of the Victoria and Albert Museum, then taught English and History at High Schools in Australia. SC is a professional artist, has worked as an artist in the restoration of several large historical buildings, ran an art gallery, and is currently working towards a Fine Art Masters degree at Newcastle University, NSW. SZ ‘dropped out’ of Industrial Design at Newcastle University early due to pressure of outside work, and pursues study at institutions or learns from experts as he finds it necessary. He has received commissions from Newcastle Council NSW to design and fabricate works that have practical use in community place making, and he has been involved in fabricating large sculptures in Newcastle NSW City area. The other two participants have attended a number of short visual arts courses, and worked constantly in a variety of drawing, painting and sculpting media for a period of more than ten years. Also it is important to note that four of the participants, BB, BRob, EK, TS, are members of a life drawing group that had been meeting regularly for three years.
at the time of data collection. Hence the relationship between collections of data made at these group sessions, followed by a group exhibition. Despite this link however, with such varied backgrounds it is considered that all these artists offer differing personal experiences that are of value to this study. All have been interviewed separately about their own work processes.

Data Collection

A combination of fieldwork data has been collected. This comprises written notes from observation of artists at work; audio taped spontaneous discussions evolving in a studio setting whilst work was not in progress; semi-structured interviews taped when the artist was at rest and reflective in mood; plus photographic records, which combine to provide a comprehensive representation of the artists’ processes. The variety of data collected aims to add verification and validity, and so maintain the integrity of the over all study (Moustakas, 1990). The use of multiple data sources is seen as vital, because apart from acting as mutual corroboration of validity, they also contribute as much interactive understanding of the nature and meaning of the experience of artistic creative process as possible, and where one method may be suitable in one circumstance it may not suit another.

The data collection for this study took place according to individual artist’s availability. A preliminary meeting with the participants also provided an introductory discussion on the artist’s background and their work. It was audio-recorded, later transcribed and began the data collection. It required repeated visits to several artists, whilst the research was completed in a single session with others. The place of activity was that of individual artists’ studios, and in the case of artists belonging to a group, the site was that of the group’s work place, and later at two of the artists’ homes for interviews. Initial contact with potential subjects ascertained their availability and place of work, artist’s studio, home, or other preferred place.

This combination of methods of data collection has resulted in involvement and immersion in the data on the part of the researcher (Eisner, 1998). Observation of the artist at work has been most valuable in gaining information on individual creative processes, also enabling written and photographic observations of non-verbal dynamics, important in reflecting on the artist’s relationship with their work in progress, and
particularly of use when discussing progress with the artists who do not necessarily remember how the work developed (Petsch, 1998).

The researcher has kept Field notebooks; both notes made on site, and elaborated notes made on reflection following the experience of watching an artist at work. These vary in content as sometimes it was not possible to write and photograph at the same time, when the artist worked quickly, and on other occasions a taped discussion evolved instead. In addition there were times when it was possible to write in-depth observations of process. The discussions with the artists followed an informal pattern, “relying on a spontaneous generation of questions and conversations, a naturally unfolding discussion” (Moustakas, 1990, p.47). Spontaneous discussions have therefore been informal in structure, with questions based on observed development of the creative processes, complemented by Part A theory studies absorbed by the researcher, and on the researcher’s observations and ideas developed as an experienced practising artist and art teacher. It is hoped that this personal experience offers a window for new perceptions relating to the research rather than acting to restrict it by providing tight parameters of a limited personal viewpoint (Eisner, 1998).

A photographic record of the progress of the artworks illustrates both the processes and their products (Amabile, 1983). In most cases it was possible to make these records at intervals during the creative process, in order to better understand the process (Stokrocki, 1991). They have also been of value to the participating artists, both simply as a record of work and in enabling them to become more aware of their process of work. The art making process is not necessarily represented by the finished product, as it may undergo many and varied changes during its development, nor may an artist’s memory of the development of a piece of work be seen as totally reliable, as discussed previously (Arnheim, 1954; Cytowic, 1993). Francis Bacon noted experience of unreliable memory, commenting to his interviewer Sylvester that it would be of interest to him to see a record of the development of his own work, because once lost in the work it was difficult for him to remember its varying stages of development, which he found a disappointing aspect of his creative process (Sylvester, 1993). An artist who works within a state of reflection may find difficulty in remembering consciously what may be essentially a preconscious process, perhaps remembering what was done, but not necessarily the process, nor the development of ideas behind it (Stein, 1974; Sylvester, 1993). They are working in the moment. This is why it was a valuable
exercise where possible to consider the photographs of developing works whilst later discussing their art making with the artist participants.

The intention of the final interviews was to take the artists through remembered stages of the artwork, to reflect on the process involved and to discuss the resulting artwork. These semi-formal interviews commenced by exploring questions relevant to individual creative process, then continued by allowing a naturally developed discussion to follow. Many questions arising directly from Part A were explored in the interviews. The questions used in guiding the interviews are to be found on the accompanying CD. Sometimes these were found inadequate for the occasion, and merely served as reminders for the interviewer of areas of reference.

At no time has the consideration of Chaos Theory been directly discussed with artists in relation to their work, the main emphasis being on their process of making, and those elements that they believe influence their individual processes.

Data Synthesis

The research in this project itself reflects the topic since it too, is also a creative process. A synthesis of research findings should reflect researcher immersion in the research experience, and reveal knowledge absorbed at an intuitive, preconscious level by the researcher, in combination with conscious synthesis of collected data. Themes have been allowed to emerge from the data, and any links between the artists’ creative processes are explored in relation to the framework suggested by the theory section of this dissertation.

Exploration of the research data has been aided by use of the computer qualitative software ‘QSR Nudist 4.’ This software has been used in the identification of important elements of artistic creative process as identified by the artists in the data collected. Such a means of identifying and storing ideas contributed to an evolving system of synthesis that has offered an excellent means of processing the data. ‘QSR Nudist 4’ provides a system that is an open-ended creative process, and that sits well with the theme of this study as a whole. Consequently, and in keeping with the study, the methodology has evolved with the synthesis of data processing using ‘QSR Nudist 4’. Results of this methodology have pointed to an interrelationship of parts that appears to be best reported by means of an interactive CD. This process of synthesis of data has offered the researcher the opportunity to engage in ongoing analysis/synthesis of data
within a changeable reporting system by using both ‘QSR Nudist 4’ and ‘Dreamweaver’ (web-page) software. It was intended to introduce the reader to a system of pathways similar to those of the earlier diagram encountered in Part A illustrating possible iterative pathways of the creative process. However, restrictions of time have limited this exercise to simple presentation of the elements that comprise the final stage of synthesis. It is however a very plausible means of interactive synthesis that may be followed at a later date with a similar study.

Therefore a synthesis report is presented here, but in addition that synthesis may be considered by accessing the data to be discovered on the attached CD. In this way, and in keeping with the premise of this dissertation, an open reporting system is provided. One of the primary aims of this exercise is to expose the validity of the empirical study by providing all data for consideration. The other important aspect of such presentation is to offer the reader the opportunity to become involved in their own interpretation of the given information, thus recognising the importance and validity of individuality of interpretation and expression. The CD is equipped with pathways that lead to all the data and contributing elements of the synthesis, such as early synthesis pointers, arranged in a simple self-organizing structure. In this way the reader is offered an opportunity to interpret the data and visit text and memo selections made by the researcher connected with the original and changed synthesis pointers and definitions.

This method of presentation also provides the most satisfactory means of offering the photographic data connected with the study for easy reference.

This method of communicating results of the collection of empirical data would also appear to best reflect the character of the present thesis, which rests on the premise that an interactive, self-organizing structure lies at the heart of all human creative processes, especially that of the artistic creative process of the visual artist.

The potential of this methodology is that it could lead to further expansion of information to be gained from the data, by extension of the pathways provided, and if it were to be published as a web page that engaged comment and discussion from interested contributors, thus opening a www. portal to sharing information and understanding on the subject of the artistic creative process.
**Data Synthesis Report**

The method of research followed is a synthesis because it works by gradually exploring links between elements of the data. These links are isolated under headings that appear meaningful according to the theory of Part A. It is a process of pulling together sections of data under different headings, nodes, and synthesis pointers. These are further studied to find any links between pointers, or indications of changing definitions of the pointers that may lead to emergent meanings. Pointers may be combined in order to explore their integration and possible new meanings. Thus the process is one of bringing the structure of the synthesis into an interrelated form that may lead the reader to follow clear links between foci (attractors) involved in the reflective nature of the artistic creative process.

Whilst considering this synthesis of data the researcher is constantly aware of seeking to answer the ever present and over-arching question ‘How does the artistic creative process work?’

The data has been approached from various directions enabled by ‘QSR-Nudist 4.’ Searching to reveal individually important elements of process or links and counter links between the creative processes of all participant artists has been an illuminating creative process. Information regarding the occurrence of reference to the synthesis pointers taken from Part A was gleaned from text coding searches and the resultant reports considered in relation to parallel searches with other pointers. All documents were first submitted to coding according to significant points made by each artist, elements of their creative processes that they themselves deemed important. After this they were searched and coded according to the synthesis pointers previously gathered. (See accompanying CD for the initial list of possible synthesis pointers). Some of these were found to be appropriate and others were discarded or integrated into others that better described the aspect under consideration.

Following this process, the selected text was further scrutinized in relation to the definitions suggested by the meanings that they generated. Consideration of the possibility of links between meanings relating to the coding definitions in all cases has resulted in some interesting indications and links that are described in the accompanying diagrams. An early attempt to construct a model of the creative activity
was based on a linear cycle. This uses the linear cycle discussed in Part A and links the essential elements to this cycle.

**Figure 7 - Elements linked to a linear cycle view of artistic creative process**

However this arrangement is unsatisfactory because it indicates a ‘one step at a time’ approach to the artistic creative process, viewed as a cause and effect activity consisting of finite stages. In order to develop a model that indicates an interactive, fluctuating process a break-down of more elements was considered in conjunction with data synthesis.
Figure 8 - An early stage of the synthesis process

Art Making Data Diagram 1 taken from Free Nodes

1 Creative Process
3 Motivation
4 Context
5 Learning
6 Sharing
7 Structured Openness & Freedom

Motivation
1 Personal values
2 Emotional Motivation
3 Enjoyment
4 Experience

Context
1 Personal
2 Cultural

Learning
1 Influences
2 Knowledge
4 Skills
5 Experience

Structured Openness & Freedom

Creative Process
1 Immersion
2 Reflection
3 Self-Organisation
4 Interpretation
6 Habit of Process
8 Attitude
9 Individuality

Reflection
1 Consciousness
3 Feeling
4 Emotion
5 Memory

Consciousness
1 Preconsciousness
2 Awareness

Preconsciousness
1 Concentration

Concentration
1 Selection
2 Focus

Self-Organisation
1 Iteration
2 Attractors
3 Scale
5 Interdependence
6 Connections

Interpretation
1 Media
2 Meaning
3 Concepts
4 Nature

Experience
1 Acquired Knowledge

Experience Acquired Knowledge
1 Acquired habit

Immersion
1 Constants
2 Sensitive Dependence on Initial Conditions
3 Experience

Experience
1 Acquired Knowledge

Feeling
1 Choice

1 Choice

1 Selection
2 Focus

Art Making Data

Diagram 1

taken from Free Nodes
Continuous consideration and reassessment of the definitions relating to the elements in the diagram shown above led to the following pattern of definitions that included self-organization as a separate main section. This was accompanied by Immersion, Incubation, and Interpretation as main headings with attendant sub-headings of Motivation, Context, Evaluation, Learning, and Personal Experience of Process. These were changed again later on further consideration of definitions and apparent relationships of elements, and as more data information was collected, as shown below.

The list of interrelated elements indicates those that survived the process of elimination. There are 44 in all, and may be found listed in the form in which they emerged from the synthesis process, on the accompanying CD under the heading ‘coding lists.’

A need to further qualify understanding of these elements and their relationships eventually resulted in the diagrams ‘Research Synthesis Results,’ and ‘Research Synthesis Definitions’ which follow. These diagrams map aspects of the artistic creative process in relation to one another as a tree with branches, and show definitions as they stood when the synthesis reached an end. The final diagram ‘Research Synthesis Results,’ describes apparent relationships between elements of the creative process, and is complemented by the diagram illustrating ‘Research Synthesis Definitions’ that presents the definitions that evolved during data synthesis. In accord with the nature of qualitative research, and this present research in particular, it is acknowledged that these relationships of elements and their definitions are made in relation to this particular set of artists’ data, as synthesised by this particular researcher, and that the research would perhaps have developed differently if approached by another researcher.
**DEFINITIONS RELATING TO ART MAKING**

**Self-organization**
- Intereolate/sequential growth
- Iteration - repeated visits to the same place with feedback = recursion
- Attractors - point of focus of activity
- Scale - related similar elements varying in size
- Irreversibility - not repeatable
- Interdependence and networks - interacting elements of system
- Connections - relationships between elements
- Tension - balance of dynamics of process
- Bifurcation - pattern of growth and change

**Innovation**
- Creative process - description of process relative to art making
- Immersion - becoming absorbed in preparation for art work or in making art - in information and skills
- Constants/homeostasis - search for constants
- Sensitivity dependence on initial conditions
- Experience acquired knowledge
- Acquired habit

**Motivation**
- Motivation - incentive to create works of art
- Personal Values - inspired by own sense of meaning
- Emotional Motivation - responding to emotional motivation to make artworks
- Enjoyment - enjoyment of achievement through art making process
- Experience - the experience of art making is motivating

**Context**
- Context - general references to contextual influences
- Personal Context - aspects of personality, biology, influencing or affecting art making
- Cultural Context - influences of culture on individual art making

**Evaluation**
- Experience - experience of art making is motivating
- Personal Context - aspects of personality, biology, influencing or affecting art making
- Cultural Context - influences of culture on art making
- Sharing - sharing artworks with others

**Learning**
- Learning - acquiring information, knowledge about something
- Influences - anything that has directly led to changes in learning
- Knowledge - stored information
- Skills - ability to do something by using specific means
- Experience - learning by doing

**Interpretation**
- Interpretation - creation of an artwork in the process of art making in order to explore an idea, concept, subject
- Media - technical means of interpreting ideas, thoughts and feelings
- Meaning - individual understanding gained through art making
- Concepts - ways of thinking about something (in this case relating to art making)
- Nature - feeling in tune with nature as part of the art making process
- Subject-matter - the subject-matter used as source material or inspiration for art making

**Personal Experience of process**
- Flow - sense of fluidity of process
- Flair - sense of activity
- Attitude - idea about or intention towards a topic or process
- Individuality - that the artistic creative process is an activity involving an individual
However the diagrams present a coherent, intelligible, databased, and rationally derived interpretation of the creative process as a nonlinear system that stresses the interaction of parts in order to become effective.

**Meanings, Definitions and Interpretations**

The synthesis emerged by a process of elimination of those pointers that appeared not to be eliciting relevant information from the data, or by combining those that seemed to hold similar meanings and were coding the same data relating to those meanings. This process of comparison and elimination brought out a selection of text most relevant to the project, and meaningful to the phenomenon. These collections of text were considered in the light of definitions chosen for each of the pointers, both of which were changed according to the direction of meanings gleaned from the texts in a balancing and rebalancing exercise. They may be visited on the accompanying CD presented in the form and under the headings by which they were finally listed.

It became apparent that all elements of the artistic creative process are very closely interrelated, that elements selected for their occurrence in the data combine well with some of those elements suggested by the theory. All component parts of the artistic creative process may possibly be rearranged or eliminated according to another researcher’s ontological influences and considerations, but the following is suggested as a grouping that may be viewed as an interactive feast of ingredients for artistic creativity. These results illustrated in the diagram on page171 show the dynamic structural elements that compose the artistic creative process according to the above empirical research synthesis. The main areas are *creative process, immersion/preparation, incubation/reflection, and interpretation*. Immersion/preparation relates directly to *sensitive dependence on initial conditions*, a summary heading that summarises all the possible influences on the initial activity. This area is fed by *motivation* and *context* that in turn contain a number of elements of their own. *Incubation/reflection* and *interpretation* similarly contain a number of interrelated elements. Definitions relating to these structural elements may be found in the second of the following diagrams.
Research Synthesis Results

visual artistic = a self-organizational system
creative process of interdependence, networks, links and connections

immersion/preparation

motivation
personal values
emotional
enjoyment
experience

experience acquired knowledge
acquired habit
individuality

context
personal
cultural
sharing
knowledge

incubation/reflection

consciousness
flow
feeling habit of process
tension
emotion
preconsciousness
concentration

interpretation

media attractors
meaning scale
concepts iteration
nature irreversibility
subject-matter
constants-homeostasis

flow habit of process
Figure 11 – Research Synthesis Definitions

Research Synthesis Definitions

Visual Artistic Creative Process = A Self-organizational System - process relating to visual art making

Immersion - becoming absorbed
in preparation for art work or in making art - in information and skills

Sensitive dependence
on initial conditions

Incubation/Reflection - consideration of all related information held by the brain
Consciousness: the transient state of mind that is involved in moment to moment awareness/knowing/apprehension
Preconsciousness: unaware mental processing

Feeling - a sensitive awareness of something
Emotion - strong feeling
Memory - remembering previous experience or stored information

Flow: sense of fluidity of process
Habit - of process activity
Tension - balance of dynamics of processing information
Concentration - focusing attention on an object
Selection - selection of appropriate information
Focus - concentration on one particular thing

Interpretation - creation of an artwork in the process of art making in order to explore an idea, concept, subject.
Media - technical means of interpreting ideas, thoughts and feelings
Meaning - individual understanding gained through art making
Concepts - ways of thinking about something (in this case relating to art making)
Nature - feeling in tune with nature as part of the art making process

Constants/homeostasis - a search for constants / balance

Interrelated/sequential growth

Interdependence and networks - interacting elements of systems
Connections - relationships between elements
Bifurcation - pattern of growth and change
Irreversibility - not repeatable

Motivation - incentive to create works of art

Personal Values - inspired by own sense of meaning

Emotional Motivation - responding to emotional motivation to make artworks
Enjoyment - enjoyment of achievement through art making process
Experience - of art making is motivating

Experience acquired knowledge
learning by doing

Acquired habit - repetition of activities

Individuality - that the artistic creative process is an activity involving an individual

Learning - acquiring information, knowledge
Skills - ability to do something by using specific means
Evaluation - measures of judgements of work

Subject-matter - the subject-matter used as source material or inspiration for art making

Flow - sense of fluidity of process
Habit - of process activity or routine
Iteration - repeated visits to the same place with feedback = recursion
Attractors - point of focus of dynamic activity
Scale - related similar elements varying in size
Irreversibility - not repeatable
Tension - balance of dynamics of process
CHAPTER SIX
RESEARCH SYNTHESIS

The data has been approached from various directions enabled by ‘QSR Nudist 4’ and ‘Dreamweaver’ software. Searching to reveal links and counter links between the creative processes of all participant artists has provided illuminating results. Information regarding the occurrence of reference to the synthesis pointers taken from Part A was gleaned from text coding searches and the resultant reports considered in relation to other searches. The documents were submitted to coding according to the same synthesis pointers, but only after they were searched and coded according to important points made by each artist, him or herself. Consideration of the possibility of links between meanings relating to the coding definitions in all cases has resulted in some elucidating indications and links.

The synthesis of data has served to eliminate some of the elements that were initially considered because they did not appear to be an intrinsic part of the artistic creative processes of the participant artists. Others were dropped that could have been further explored if time had permitted. These include the subject of skills, which was incorporated into the Motivation/experience/learning area, but could, (as with many other elements) have been placed into almost all other areas of artistic creative process according to the emphasis that the reference carried. Following this procedure it became apparent that all elements of the artistic creative process are very closely interrelated. It is very difficult to isolate elements of artistic creative process without acknowledging their relationships with all other elements. It was also found that elements selected for their occurrence in the data successfully combine with those elements suggested by the theory. Those elements that were not supported by the synthesis were discarded; leaving the forty-four identified, related, elements that are mentioned above, and may be found listed in the appendix.

This report is made in relation to the two synthesis diagrams above, and the text and memo extracts, the ‘rough data,’ and ideas, that are to be found for reference on the accompanying CD. The main elements as illustrated in relation to one another in the diagrams above relating to research synthesis are considered one at a time in relation to
examples from the data, and are initially identified by *italics*, the main areas of synthesis in *CAPITALS*.

When considering the *ARTISTIC CREATIVE PROCESS* as a whole experience, it has been suggested in Part A that it is best described as a self-organizational system because of the interrelatedness of all the component parts. Following a characteristic of other non-linear systems, it appears capable of functioning without some of the parts, but all those elements that are present at any one time contribute in the generation of new developments that concern the individual as a complete entity. Participants relate this as a complete involvement in making. BRob explained this experience,

BR - I mean are you aware of what’s going on around you, or?
BRob - Not a lot, especially if I’ve got some nice music. But I probably don’t even know that’s going. I could hear the phone. But when I’m at the class I’m really immersed in what I’m doing. Sometimes you hear people talking, but it doesn’t always mean a lot. But it’s a nice feeling. It’s nice to be able to just switch off from everything and get involved in what you’re doing. And sometimes that may only last for a little while because you get tired, or you get distracted, or whatever. So it doesn’t last for the whole time that you’re doing art. But I think it’s a good feeling. I enjoy the feeling (Interview with BRob -374-380).

EK’s summary of the same point is more comprehensive:

EK - I ‘spose, well, a creative process is using the mind, the subconscious mind, the hands and the media to get it all down, and everything you’ve learnt. Well, I mean it’s your whole life, I mean. It’s you. I ‘spose (Interview with EK: 125-128).

Examples of participants working may be found on the Data of EK, BB, and TS. These show involvement and concentration in relation to their work. Capturing non-verbal dynamics would perhaps have been better done by use of a video camera, but this would also have extended the study beyond its current parameters. However, a description of those dynamics is considered from the point of view of the extent of involvement shown by the artist in their work, as witnessed by the photographs, and in field notes relating to BB and EK in particular.
Involvement of the whole person in art making is not a new concept as discussed in Part A. In relation to this, Kindy (1999) discusses blindsight, whereby people exhibit a visual awareness of events although they may to all intents and purposes be blind. This is a consciousness phenomenon currently under consideration by neurologists, and appears to be a result of whole body sensitivity, and that this may be “a key to a deeper understanding of the complex structure underpinning artistic experience” (Kindy 1999, p.61). Perhaps the totality of involvement in their work is an indication of such sensitive wholeness; perhaps it is merely a sign of deep concentration. It appears to have an effect on the whole person that has an effect on an artist’s attitude towards life. SC comments:

I think that just on an individual basis I think people try and respond creatively to the environment all the time. Just because you don’t have something (a particular material) it doesn’t mean life stops, you create (with) something else and I think that ability to create something else is really important, to survival, just basic survival. (Interview with SC: 313-317).

SC considers his creative process to be a part of his everyday life.

Just basically developing methods and strategies to solve a variety of challenges. I think that overflows into your everyday life. It doesn’t have to actually relate to your art making practices, but I think that sort of really – I think that develops any creative activity. It broadens your mind. It makes you explore things. It does make you – it stops you from taking things for granted (Interview SC: 60-65).

Similarly SZ works with his creative process as if it has a life of it’s own, and one that is of a natural origin.

Its one thing to have a plan, I think that’s only the plan of how you start – but that’s only, its never really - unless its done by, you know, drawn by a draftsman, but I don’t work with that sort of thing, I just know full well that I’m going to change things as I go ‘cos it just seems to be no matter how hard you seem to rush things and make them go quicker, there seems to be a natural process that, that you, you must go through in order to come to the end result. You can’t push it through, because, you know. Just for example, there are things that I’ve had sitting round for ages, I just, just can’t bring myself to touch them, you know. And they’re jobs, I’ve just got to keep walking past them and some day, some day, some time I’ll go ‘Oh yeah, I’ll do that today, I’ll work on that’ – because the time is right to work on that. And when I start doing it I make
progress and I change things, and I think to myself, if I had made myself do this last week I probably wouldn’t have done this, this way. I would have done it a different way. And I like the way I’ve done it now, you know. And that’s the way it seems to work with me, and so sometimes things take longer than they should but it seems to work out better. ‘Cos I think my brain um, chews it over and then, and then decides which is the best way to actually do the job, and when I’m ready it tells me, and I go and do it.

And:

SZ - I stay at one thing for a while and then I um, - I just can’t think about it any more, I think. I keep trying. I think about my work on the computer - I think I just can’t do this any more, so I have to go away and leave it. Then things happen in your head and you come back and you’re able to continue and I think that, um.

BR - Do you have several things going at once?

SZ - Yeah, I have now, I’ve got five things probably. I’ve got things in machines waiting for them to be turned on to have things done to them (laughs).

(Preliminary Interview with SZ: 137-165).

Also, from the same discussion:

SZ - I believe that if you start - if you have a start there’s an end, you just have to keep going and it, it resolves itself.

BR – Yes.

SZ - So you start making something, you say O.K. I need to make this shape, umm you work out how you want it to look, then you find materials that have those characteristics and you try to make it out of those materials, and then once you’ve done that it can, it tells you something about itself - it says O.K. I’ve got this shape now - things you couldn’t visualise before, and I can say I can have that bit there, a new shape, that shape that I want. And then when you’ve done that, that resolves another problem for you. You would never have got, you would never have known that if you weren’t at that stage, so umm, when you’re doing things like that its conceptual, it’s prototype stuff.

(Preliminary Interview with SZ: 180-190).

SC also explains his approach to his creative process as if it is a separate entity, which was indeed referred to by both of us as ‘it’:
BR – Right, so you don’t sort of hold back and give it parameters to work within, you just let it go?

SC – Let it explore what can possibly be released. That can feed back into different sorts of things I’ve been thinking about with the content. It can sort of elaborate the process. (Interview with SC: 17-21).

And:

SC – Well I have to take in account that creative process, because sometimes I get to a stage where I’m blocked in some way, or can’t sort of – I can’t solve a problem. Sometimes I need to approach it in a purely organic way, and sometimes just leave it. Then work on something else and then approach it in a different fashion. Other times I might see something on television, or might be speaking to someone and an idea will hit that would feed into that creative process that solves that problem at the particular time.

BR – So it’s going on all the time, this sort of mental process, not in a conscious state, in an unaware sort of state, you’re not really aware of what’s going on there? Or do the ideas just suddenly pop into your head do you think? Or?

SC – Sometimes you can actually work through it through processes that you’ve developed at other times, you’re extending beyond it, and sometimes just really posing a question to yourself. Sometimes it just materialises in some form if you know what to look for (Interview with SC: 12-10).

Surrendering to artistic creative process in this way does not seem to indicate total lack of control, but rather a deep understanding, a construal, of the natural flow of the process as a whole, a respect for the elements that govern it, and an ability to work within this flow of activity. This may be inhibited by various stresses, for example TS took a while to calm down and work on the day that we collected her data.

TS - I don’t know. When I came in this morning I was a bit agitated because I’d had a busy trip up from Sydney, and I think that’s probably why I wasn’t really into it, and that’s, I think that’s probably quite a bit of the reason why the original one didn’t work, because I hadn’t relaxed. I wasn’t concentrating. I wasn’t into it. And I’m just looking and saying oh yes this colour goes here and that colour goes there. So I wasn’t really just letting it flow. So that’s what it was. So when the state of mind when I’m not really thinking I think is when I’m –
not consciously thinking ‘oh yes I’ve got to use blue, or I’ve got to use green’ it just happens (Interview with TS: 394-401).

The development of her work on that day is documented on the data CD, and shows a gradual relaxation into her work, involving two ‘false starts’ or ‘warm-up’ drawings that were followed by an in-depth study that was very successful and even resulted in unexpectedly easy production of two extra pieces of work. Perhaps the motivation for this was the result of a strong determination to make the most of a trip from Sydney to Newcastle to work for the day.

IMMERSION/PREPARATION, INCUBATION/REFLECTION, AND INTERPRETATION, isolated as primary areas of the artistic creative process earlier, in Part A, have again been selected as key elements of the artistic creative process activity by this research. They regain their places allotted in the theory section of this dissertation as the three main dimensions of creative process. This developed because after experimenting in synthesis of data with other combinations a return to these recognised ‘stages’ of the process better facilitated grouping of those elements that immediately relate to them, as illustrated in the last two diagrams.

Allied to these areas however, is an important addition to these ‘stages’ of the process that points again to the value of envisaging the process as a network of elements. It is that of sensitive dependence on initial conditions, which has found a place associated with IMMERSION/PREPARATION as it is an area that governs the artist’s initial approach to work. All factors affecting immersion appeared to relate to a ‘sensitive dependence on initial conditions,’ as contributing to creating the particular working climate unique to the artist concerned.

Immersion is defined for these purposes as becoming absorbed in preparation for artwork or in making art – in information and skills. It marks the starting point of the artist’s activity, and is an aspect of art making recognised by them in assessing their readiness to start a piece of work. It may be said that the artist exhibits a particular sensitivity towards immersion in preparation for art making as a precursor to practical activity. For example, BRob was emotionally affected by the thought of working with stone after a period away from using it.

BRob - ‘Cos I was frightened to touch the stone again thinking its going to be so hard for me, but when I just put the chisel in I thought oh, this is easier than
that. It’s just that every now and again with the stone you get a hard sort of fibre or something, or a different sort of stone comes through (Interview with BRob: 104-108).

Working with and discussion with BB revealed the sensitivity of her initial process of developing an involvement with the subject and its mode of interpretation. At commencement of data collection for the main study, she found the noise of the camera too much of an annoyance to allow her to develop an involvement with her work, saying, ‘go away’ (See Field Notes for 30-9-00 on CD). So I found it necessary to only take photographs when she stopped working. She also complained to me later of the insensitivity of other members of her group who had walked between her easel and the model when she was trying to initially become involved in working. She was equally annoyed with herself for being easily distracted by activity around her, finding it difficult to ‘switch off’ at first, especially feeling under pressure to perform for the research.

Making preparatory drawings in order to ‘warm-up’ was a means of immersion into the work for the members of the drawing group, of attaining a satisfactory level of concentration at the same time as becoming familiar with the subject-matter. EK ‘switches off’ easily, not noticing surrounding activity as she ‘warms up.’

EK - Yes I did a rough sketch, in um, black pencil, graphite pencil which was totally wrong, and I altered that quite a bit and then went over it with uh, blue oil pastel sort of thing, and a bit of the drapery too, umm, till I felt that I’d sort of got the essence of it and could um work it out so, everything was fairly well in its right place. Then I left that and then put it on another sheet and started - and it helps you, definitely gets your eye in, warms you up (Interview with EK: 23-27).

BRob mentions a need for routine in preparation for making a new piece of work. For her the group situation also helps her to relax and become immersed in work, to ‘switch off.’

BR – So, in your process of working, do you think you’ve developed a routine of any sort? I mean it sounds like the warm-up thing is definite?

BRob – Yes it is. I have to have developed a routine in class, because I get into it much quicker now than I used to and I must be doing something to get in there quicker (Interview with BRob – 451-455).

And:
BR - So what do you think is necessary before you can become totally immersed in what you’re doing? You described this with sculpture, what about with the drawing, and the class, group situation? What do you need to - Is there some kind of routine?

BRob - I think it is easier in the class because yes, we do have a routine, and we have music, and we all get set up, and its right, now that’s it, and we’re ready to go. And then you start your warm-ups and its sort of more over to you then how get yourself into that situation. But away from an art class it’s a little bit harder. I have to be more organised and have to switch off from the phone or whatever else is going on. And I find that much harder, because this room is so messy too, whereas at E’s it’s not messy and it’s all set up.

BR - And it’s somebody else’s place.

BRob - Yes, it is somebody else’s, whereas in your own home you do a bit of this and you do a bit of that and its all sitting, so I’m probably my own worst enemy in one way. If I’ve got the time and I’ve been able to switch off from everything to come to this room, it doesn’t always work, so I often go up to the kitchen table to get away from it (Interview with BRob – 388-402).

For SC materials provide the starting point for his process, inspiring interpretation of ideas.

SC – Well in this case that’ll probably happen to this one, but um, I mean that (the Penguin) was almost fully conceived already, where this sort of - I had a few materials and I put them together and it came together very quickly. And that happens sometimes, but other times you start not having any idea and actually use the materials to um, resonate some qualities that you start to play with, and manage and, and come up with something that’s in keeping with your mass of ideas that you have that sort of come out of your unconscious. (Interview with SC: 130-138).

The concept of resonating materials is one that is an important part of SC’s interpretational skills. His immersion stems from an association with the materials that he chooses to use in his art making process, which in turn dictate their developing forms alongside his ‘intellectual aspect’ (Interview with SC: 12-10, 130).
Sensitive dependence on initial conditions perhaps also explains one aspect of why art must be experienced as an individual, both as a maker and as an audience. It is also perhaps why the artistic creative process is so subject to change, as initial conditions change with the development of a piece of work. At every moment of the artistic creative process there is an unfolding of interactivity wherein every aspect of the process is affected by what may happen to every other aspect, the new reaction through artistic activity, becoming an aspect of the past. Influences on sensitive dependence on initial conditions appear to involve motivational aspects of the process, which in turn are influenced by personal ontogeny and the emotional state of mind at that moment in time, interdependent variables pulling and pushing each other (Goerner, 1995).

SC has a very strong emotional motivation for making his work that is based on social problems encountered whilst coming to terms with his homosexual identity, a deeply based emotional incentive to make art works.

BR – Do you feel an emotional tie to your pieces of work? If you look at something you’ve done previously, say a couple of years or so ago do you sort of think ‘yes its good’?

SC – I’m just finding it difficult to contextualise emotion. Or I guess the basis of a lot of my work is driven because I felt quite angry by the fact of the way that I was being defined. I think that’s really motivated me. Its sort of developed things in a way that they probably wouldn’t have developed if I hadn’t have had that strong emotion behind my work, that strong motivation. I mean you turn it into something positive I think, that negative, that anger, that feeling of frustration and disempowerment, or disenfranchisement. It’s – you can turn it into something else positive.

BR – It’s a huge motivation really.

SC – Mmm. Which I guess everyone has to some extent.

BR – In some way or another, yes.

SC – It’s a driving force I think.

(Preliminary Interview with SC: 358-370).)

Later he emphasised the recently growing intellectual content of his work, seen as a controlling influence over his motivating emotions.

SC – Some artists, they work on a purely emotive base and I guess their work
is purely sensual and they’re concentrating more on emotions. For me moving out to that intellectual aspect is really important. I think that keeps in check your emotions and I think for me it’s a stabilising influence, that intellectual process (Interview with SC: 12-10, 128-131).

BRob also speaks of her emotional motivation in regard to making art works, also referring to being ‘driven.’

BR - What do you think is motivating you to make these artworks?

BRob - In the sculpture things you mean?

BR - Well, all of it really.

BRob - Oh, I don’t know. I’m driven. Once I’ve got the bug to do art I just want to do it, and do it and do it. It’s a good switch off for me I - I - it just switches off to whatever else is happening. An I wanted - when I first started I kept thinking I want to get better, I want to get better and every year I want to do that and I want to get, improve.

BR - So that’s the main motivation - that you want to get better at it?

BRob - Not now so much as I just want to do it. I just enjoy doing it now. I’m probably at the stage where I think Oh, I can do it, and if something goes wrong I know how to correct it to a certain degree, or just put it away, which took a big lesson. But I just want to do it because I just enjoy doing it now. And I’d be quite happy to spend weeks just doing it, you know, which I could, if I could (Interview with BRob: 114-123).

There is much mention of enjoyment of the activity of art making, so this has been listed in the diagrams separately from emotion for the emphasis it offers as a motivational factor. A contributing reason for this inclusion is that the indication that art making is potentially enjoyable has been a result of previous experience leading to such anticipation. Therefore enjoyment is an important factor in motivation related to artistic creative process that is also linked with habit of process.

Hence a link also with experience as an important component in art making for these artists, as it provides motivation for them to continue an activity, or start a new one.

Pure enjoyment is a strong motivation, but BRob also links art making with her state of health.

I think I always feel good when I’ve been doing art. If I haven’t been doing art
its almost like I haven’t walked the dogs. (Laughs) Its sort of a something that I feel better for doing it? Because I’ve had quite a few little problems in my life and it’s a real time for me, and it’s a switch off, and I think I cope with life better. Like if we go away for holidays, and I don’t do any art because, you know, you’re tripping around and whatever, I get a bit frustrated, and I get a bit moody, or a bit down in the dumps, and I think I’m better if I can do some art (Interview with BRob: - 493-499).

As discussed earlier in relation to BRob, acquired habit, due to experience of art making, provides motivation, perhaps almost a kind of addiction, as it leads the artist to return to art making as a way of seeking personal meaning, found in the case of SC, or viewed as a health making activity by BRob. EK also alludes to a strong need to make art that is based on previous experience and exuding pure enjoyment.

My motivation to produce artworks is the love of drawing and painting. It is your creation and one of the few things only you are responsible for. It’s a wonderful feeling if you can reproduce something you consider beautiful. It is food for the soul and is compulsive (EK Written Answers: 6-9)

SZ enjoys the individuality experienced in making creative works, but this has been confounded by the influence of the various authorities for which he attempted to work. So strong is this feeling that he is now earning money with totally different work so that he is free to make creative craftworks in his own way, with no commercial intrusion from outside his workshop. Interviews with SZ whose work has been integrated into societal parameters as practical art forms used in the streetscape, are full of feelings of frustration concerning the influence bureaucracy has had on his work. So even though SC’s emotional motivation to make artworks as a personal statement is somewhat different in character from that of SZ who feel strongly about his making not being compromised, they are both rebelling against the recognised social organizational structure.

Individuality of experience is emphasised by all the participants in this research, as they all come from different backgrounds, as is shown by reference to their preliminary interviews. All have very different personal backgrounds that have made them who they are, thereby providing experiences that individually influence their art making.
Enjoyment, mentioned above, is allied to the concept of personal motivational values involved in art making. TS makes art for enjoyment, with recognition of the learning involved ‘I mean I don’t perceive myself as being a great artist and having one man shows or any of that. I just do it because I like doing it, and enjoy it, enjoy the company when I come up here, [to work with the group] and I think its giving me an appreciation when I go to art galleries and look at the art’ (Interview with TS: 447-450). She becomes very animated when describing visits to galleries, discussing her love of colour, and relating description of appreciation of colour in her life.

TS - Mmm, I look at things and think, how would I make that colour if I was painting it?
But yeah I think it basically is colour. I’m trying to get the colours that I see.
You know like I really - just simple things like I used to enjoy when I had my silver car driving up next to a red car and you could see the red reflected in the silver. It was so amazing, yeah, really great (Interview with TS: 171-175).

BB has a different personal motivation, ‘Well I want to keep on going on so that I don’t give up everything, and its, one of the great things about art is that you forget yourself while you’re doing it, you’re, you know you’re almost like a medium - I think. And I think that’s pretty important when you’re getting old (laughter)’ (Preliminary Interview with BB: – 90-93).

EK has a very close affinity with her artistic creative process.
I think that it’s been that way for the last ten years. I don’t think I’d have lived through the cancer without it, because it’s mine. It gives a purpose to your life because you’ve got to have something in later life to give you your highs and lows. I feel I don’t have a choice, because I have to do it. You learn with each piece of work that you do. Whenever I’m doing housework or mundane things my brain’s busy planning what I’m going to do. It’s geared in with your whole existence, about two-thirds of existence. You never stop finding out something (Phone Conversation EK:18-9-01: 3)

Experience of the artistic creative process is an important factor when considering motivation and sensitivity to initial conditions, as exemplified by the individuality of process in making. To reiterate, EK said, ‘It is your creation and one of the few things only you are responsible for’ (EK Written Answers: 7).
This strong self-confirming experience of individuality that the art making process provides encourages learning through making. ‘When looking through old work you realise how much more you’ve learnt. It gives a sense of achievement and a need to learn more’ (EK Written Answers: 117-118).

SC – Yeah. Well, the degree (describing the spatially dividing marks on the artwork under discussion) is the position where you place yourself with regard to an issue. Some people are just content to sit back and say well this is the way it is, things aren’t going to change. I take the position that it’s actually doing good to articulate and embody something. It’s out of reach, that you can’t initially grasp – that’s why I think that’s the reason why I create things, it’s because it’s an exploratory process, and it develops a language. It’s empowering, and … (Interview with SC 29-9-01: 48-49).

This ‘exploratory process,’ or experience of art making, is also a learning process, as it is a means of acquiring all types of relevant skills and the ability to evaluate artworks. As TS said, ‘I think it’s giving me an appreciation for when I go to art galleries and look at the art’ (Interview with TS: 449-450).

EK states that ‘you learn from each piece, even if it’s just practical’ (EK Written Answers: 101). Whilst BB considers the preparatory drawings a learning process, learning about the particular subject matter for the day.

BR - What d’you think went wrong with these second and third rough drawings?
BB - I just couldn’t get the legs and feet related to each other properly.
BR - The later, final drawing is O.K.
BB - Yes these are sort of learning - I can’t think of the right word now, but um through doing those I found out what was wrong, well presumably, but its more kind of subliminal than anything else (Interview with BB: 58-63).

And,

BB - Well, I think you have to look at the figure very carefully, and um, you have to do certain studies in order to learn what you’re looking at. So you’re sort of putting some input into the brain that way I ‘spose, and um, from that you get the synthesis which I suppose is the creative process (Interview with BB: 290-293).

SC and EK speak of the learning aspect of the creative process,

SC – No I think it’s a learning process. I think the sensitivity has to be there to begin with to a certain extent, but I think most of it’s a lot of hard work.
When looking through old work you realise how much more you’ve learnt.
Gives a sense of achievement and a need to learn more (EK Written Answers: 114-118).

CONTEXT provides the cocoon, the structural framework within which an artist works. It encompasses personal context that incorporates an artist’s ontogenetic background, their individual biological state, and therefore their receptive state of sensitivity at the time of making as well as cultural, or social context. Cultural context refers to outer societal influences developed historically, and present as the outer environmental context within which the artist works. Examples mentioned above, specifically the situations of SZ and SC exemplify the importance of contextual influence on artistic creative process.

Sharing has been included in the synthesis list because it is a contextual element influencing an artist’s sensitivity towards making art works. Artists may share at many levels, whether it be showing and discussing their work and it’s findings with fellow artists, friends and family, or fulfilling a need to move into the wider community. BRob indicates sharing her art making with her family:

BRob. - All my children have my paintings. Mum and Dad have my paintings and so the family get little bits and pieces, yeah, and I’ve put it in various exhibitions, and sold a few in various exhibitions around the place, and coffee shops, yep. And there’s lots at home, and everybody has to see them when they come to our place (laughs). So that’s sharing.
BR - That’s a thought.
BRob. - It is. And I guess I’m teaching my husband a lot more about art over the years. He doesn’t look at it as a photograph any more it’s slightly different. And the kids, I think they’ve slightly different angles now, looking at things.
BR - And you’ve got a fairly extended family?
BRob. - The grandchildren, yes they love painting. And when they come to our place they do all sorts of paintings and all sorts of collages (Interview with BRob – 71-86).

SZ talks of a different kind of community sharing:

SZ - I've done a lot of things for council that, and mostly place-making art work,
and in my way of thinking that's kind of sharing it with others. In fact some of them I've sat my arse on I really am sharing it with some others - (*laughs*) because its um.

BR - I think so, in a more permanent way really because they're there for good.
SZ - Yeah - sometimes I, I've just gone along and sat on some of the things I've made and I've just said to people - 'gee, this is alright isn't it?' - just to see the response - (*joint laughter*) - and you know - ' ooh that's really nice', you know – and I just think 'that's alright' - and then, and then just walk away - (*laughter*).

BR - Its good feedback.
SZ - Yeah, but I'm disappointed if it goes the other way. But every time you do something you always wonder whether - you know, as you go.  
(Preliminary Interview with SZ, 124-134).

Sharing art making is the area of significance for an artist caught in the commercial world where their capacity to *share* their art making is often curtailed by commercial demands, as illustrated by interviews with SZ. Due to unsatisfactory bureaucratic handling none of the projects that he discussed reached completion over a period of twelve months. Concerning money, for example:

BR - So will you tender for it?
SZ - Well, I don’t know. Because I started this more than twelve months ago and it just - it got dragged on and dragged on and dragged on, and I was led to believe the whole time that I was going to get the job. That, you know, I’d design it and I’d be doing it, and so - I was talking figures with them, and they started to - they just have no concept of what these things are going to cost. And they’re not going to be a thousand dollars, you know, they’re gonna be a lot of money. And - they’re not a lot for what they are, but, you know.
BR - Well there’s a lot in them.
SZ - The thing is, to get someone to go to into all this trouble, to come up with something like this, and then just sort of, keep on saying can you put a garbage bin in it, can you do this, can you make it do this, you know. And you can tell them that ‘I can make it dance if you wanna pay the money’.
BR - That’s right , but its gonna cost.
SZ - What happened from the start was they asked me - when we were talking about this early concept here - you know, that sort of idea, what it would cost,
so then I said oh - gave them a figure based on that. But you can see the vast difference between that and that (Interview with SZ 147-158).

The context of a person’s retained information, the knowledge that they own, has been considered in Part A as an integral part of their biology, their ontogeny. It has a place under the heading of CONTEXT because artists often refer to the knowledge that they gain as if it is valuable stored information, available for later use.

BR – So what is it that you’re building on? Is it a sensitivity that you’re building on?
SC – Well everyone who can see has a sensitivity to light and dark and I think that’s just being increasingly aware of how it affects you psychologically, or the touch of something that affects you psychologically. So it’s a build-up of a knowledge base, based on visual qualities and finding ways to use those visual qualities to express ideas, because that’s what an artist does. The outcome, whether it’s using paint or particular conventions, it’s all really the same, but it’s just replaying it in a contemporary context because of an historical precedence of using materials to communicate certain values and ideas and sensibilities (Interview with SC 12-10: 182-186).

EK considers the importance of knowledge gained while making a work, suggesting a relationship between emotion and cognition.

Knowledge of a subject helps to get the emotion and life into a subject, especially in life drawing and portraits. I have found some people I haven’t been able to draw, some I knew very well, some I didn’t. In still-life a knowledge of construction would help, but for me the feeling for the subject is the most important (EK Written Answers: 24-28).

And:
Knowledge can be gained by mistakes made, by things that have worked (this leads to) a much greater knowledge of the subject. (EK Written Answers: 72-73)

INCUBATION/REFLECTION combine as descriptors of the processing of ideas, thoughts and feelings, linking ‘states of consciousness’ with all the tacit and semi-tacit, aware and non-aware reactions that occur as integral elements of the artistic creative process.
To summarise findings relating to incubation / reflection, concentration serves to focus the selection aspects that link through feeling and emotion within a fluctuating consciousness, addressing memory and habit of process. The whole is orchestrated by tension between parts, causing a flow of thoughts, ideas, and activity. Entering into a state of concentration is referred to by some of the participants as ‘switching off’ which is mentioned above in relation to immersion, an area of overlapping concepts.

Consciousness and pre-consciousness are discussed in terms of a fluctuating experience during making, an ongoing activity. The sense of total involvement is described by BB “one of the great things about art is that you forget yourself while you’re doing it, you’re, you know you’re almost like a medium - I think” (Preliminary Interview with BB: 92-94).

SC discussed his working state of mind.

BR – That makes sense. So what sort of state of mind do you find yourself in when you’re actually art making? Do you – are you conscious of the fact that perhaps you’re really in a reflective mood when you’re working, or are you balancing a concentrated effort with a conscious sort of assessment with, you know, or do you find it fluctuating while you work?

SC – Mm. It’s fluctuating all the time. Sometimes you get caught up just doing menial things, if you’ve got a large repetitive job to do. It sort of, sometimes you have to be reflective about something, or something may hit you. You need to stop and write down what you’re thinking if it’s a thought related to your work. But it fluctuates and it’s difficult to pin down, because it depends on your mood, and your state of mind, and your ability to concentrate, and your emotional state at the time as well. (Interview with SC 12-10: 257-267).

And BRob again mentions ‘switching off,’

BRob - What my mind’s doing? Well my mind’s looking at the drawings and thinking of the model. I’m still thinking sort of thinking, now I can remember, so it’s obviously something in there besides what I’ve drawn - and I’m thinking about it. But I’m not sort of thinking anything about emotions consciously. I’m not thinking about how I’m feeling, because I’ve already got to that stage of switching off, so hopefully I’m switched off from all that’s happening, and I’m just thinking about creating the um, sculpture (Interview with BRob: 282-290).
EK believes it to be important to ‘Be able to let yourself go so the subconscious can take over’ (EK Written Answers: 64-65) She describes attaining this state of mind in which music plays a part.

‘Aware of the people around me - sometimes joining in the conversation - at the start aware of the music. I always at some stage go into deep concentration and lose awareness of everything. Sometimes on purpose, mostly it just happens’ (EK Written Answers: 80-85).

EK chose to write answers to questions before an interview, because she was nervous of being interviewed. That was a productive exercise, allowing time for considered answers regarding her conscious relationship with her work. (Reference may be made to the CD for a list of the questions that were suggested as guidance for interviews.)

Q-16a) At any stage of the work do you feel the need to step back and reconsider the work?
A-16a) - Yes, the best way to check it out for the proportions, tonal values, colours, backgrounds, and if it looks right.

Q-16b) If so, is this a conscious decision, or what do you think guides this action?
A-16b) - Mostly a reflex action because I get a feeling something isn’t right. Towards the end of the work definitely to check out what needs to be done. I know I get carried away and don’t do it often enough (EK Written Answers: 89-96).

EK, TS and BB all mentioned the need to step back from their work to give it due consideration.

TS - I step back, yes. I do work solidly at it, but then I do step back to get it in perspective, yeah, and to see whether the colours are working. Yeah, yeah. And then, and like with the hair today, I was very conscious of doing the darks and the lights, I wanted to, because that was the closest thing to you, I wanted it to be really the most focal point. (Interview with TS: 111-115)

BR - So that’s more of a conscious consideration then?
BB - Sometimes I don’t see it until I step back. So I don’t see that I’ve made this bit of blue so intense that it takes your eye away from other things that it shouldn’t do (Interview with BB: 324-326).
BB appears aware of the need to make conscious decisions in order to make changes in her work that required conscious effort.

BB - Well, I worked in a museum when I was young and, with oriental art you see, so most of that is linear, with flat colour.

BR - Right

BB - Fairly flat colour, and I think I’ve got that sort of programmed in (laughs)

BR - Yes, yes oh, fair enough.

BB - And if I want to do something different I have to decide consciously that I’m going to start in a different way (Interview with BB: 22-27).

TS comments on a similar experience: ‘TS - Yeah. I repeat the way that I start off, Yeah, yeah. When I was working with the paint I would start to use the same colours. So then I had to - I wanted to try different colours. So I had to consciously try other colours.’ (Interview with TS: 281-283).

Whilst BB discusses the learning process in terms of a non-conscious exercise.

BB - There are things that one is learning in a sort of unconscious way all the time, like what happens when you put two different kinds of pastel together, or colour you know, and that sort of thing, you know - and what happens when you put a stroke in one direction and not in another direction, its, what happens when you put a lot of white on, or some other colour you know. I can’t really honestly say that most of its really conscious at all (Interview BB: 94-99).

BRob spoke about holding a conscious image in her mind to work from, later when making a sculpture.

Mmm, to a certain degree, I mean probably when I get down the road a little bit on the sculpture, I might think, oh, yeah, I’ve forgotten, but at the moment its in my mind. I can see especially the bit that I’m working on now. I can see it in my mind even though it’s not always in the drawing (Interview with BRob: 292-294).

Asked whether she was aware of her pattern of movements when drawing, EK appeared not to be conscious of this activity. (Please refer to Field Notes from 30-9-00 and photographs of her work as it developed that may be found on the accompanying CD.) The drawing appeared to be developed evenly all over, in many layers, iteratively, one at a time. The Field Notes followed a pattern of movement from one part to another
during a concentrated period of work time. Asked if she purposely organised her approach to drawing across the different areas she became a little confused:

EK - I don’t think I’m aware of it, but I guess I have. I seem to - subconsciously – I don’t think about where I’m going to start all the time. But I guess when I don’t I usually have to start in a different place again. It um, it’s a bit of a puzzle (Interview with EK: 305-307)

BRob describes this process.

BRob - Well I guess you’re looking at um, how it is in relation to where it is, and you’re looking various colours, at shadows, at form, and a bit of the mood, what’s happening, and its all sort of - you’re in - you’re sort of computing that in a way, even though you’re not consciously thinking of it, its sort of coming through. Consciously you’re probably saying oh yes, that shadow isn’t quite there, or that isn’t quite there, so you’re sort of correcting as you’re going along with your drawing (Interview with BRob: 368-387).

INTERPRETATION carries the structure of linked changing ideas and concepts relating to a certain subject-matter, through use of materials, and ways of using them, (media) that are applied via a pattern of making that involves scale, attractors, iteration and irreversibility. Following a natural process, meaning emerges from this flow of interactive activity that leads towards a temporary sense of constancy or homeostasis, before the whole process begins again.

SC has recently become more aware of using his sensitivity towards materials in his interpretations. He has moved from simply using found materials to adapting them for specific purposes by making extra components. For example in working within his sensitivity to the resonance offered by the paper he is making to cover a sculpture. He has made several different quality papers in order to find the most appropriate one. (See SC Data on the CD for the interview of 12-10-01 relating to this process, and photographs of this sculpture in progress.)

SC – The paper that I’m making. I’ve had to try a number of different experiments with it just to go – to have a rapport with it.

So I ‘ve tried different ways of pulping up the paper to make it rough for instance, or making it very, very fine, and those qualities are really different and I’ve got to think about the ways that I could use those. A sort of a language does develop
out of it. And a sensitivity to the material that you wouldn’t maybe initially have. (Interview with SC 12-10: 228-231)

*Attractors* is a term defined as – ‘Point of attention, of the dynamic of an activity.’ Synthesis pointers serve as *attractors* within this research methodology, around which available information has been arranged. However, in the list of synthesis pointers, *attractors* are included in the area of *interpretation*, as here may be identified attributes associated with *attractors* used in visual art making (Arnheim, 1996). It is a term that may be used to describe the activity of art making when activity follows points of *attention or focus* around an art work, bringing with it all the attendant visual information from the whole surface in *concentrated* unified activity, homing in on that point for a short period of time before moving to the next. It may perhaps be envisaged as a swirling activity moving from one *focal* point to another. It is an activity that involves all the elements of the process in *concentrated attention*. (See the field notes made with EK for an example of this activity. This data, which describes her movements across her drawing, may be found on the CD in ‘EK Data’ under Field Notes made on 30-9-00. The photographs of the development of her drawing complement these notes.) A short summary from the related Elaborated Notes reads,

The drawing developed as described in detail in the other field notebook, with layers of 4 colours – red/brown, green, yellow and white, being added one upon the other until the desired effect was achieved, ending in the finer detail. Fingers were used to move the oil pastel around to mix colours and to describe form. (Elaborated Field Notes EK and BB, 30-9-00 – 18-20).

The activity of creating a visual work around *attractors* carries through to the final work, when points of focus appear to guide the eye around a work.

Similarly the use of *scale* as an appropriate term relating to art making may relate to both the final content of an interrelated work, and to the layers of work that are involved in art making as suggested by the examples of artists building a piece of work in layers. It is included in the area of *interpretation*, but may be considered in relation to the process as a whole. SC’s application of materials to his art objects is similar in character to EK’s and TS’s drawings, whereby many layers are added to the whole until the work is complete. (See CD for photographs of the development of EK’s and TS’s drawings and SC’s developing works.)
The search for constants or homeostasis has been retained in the synthesis because it describes the artist working until a balance is achieved in the work, until he or she is personally satisfied with the stage of completion. The definition to be considered in this case is simply - Search for constants/homeostasis.

EK indicates reaching a balance in her work as a whole with the realisation of having learned more than at first thought. She talks of realising a sense of achievement and a need to learn more - achieving a balanced state then reaching for more. She comments that ‘deep concentration gets rid of life stresses,’ and that art making is uses a lot of energy, leaving her ‘Usually drained, especially after hours of life drawing.’ Emotion on completion ‘Ranges from quiet satisfaction to great excitement. If it’s gone well, an urge to start another one.’ (EK Written Answers: 125-129).

Exhibition of their work is a condition of homeostasis for artists, as it is a stopping point where everything they have been working on comes to a state of balance (Arnheim, 1996). It is a very important personal acknowledgement of the meaning and value of their work and the attainment of a completed cycle (Arnheim, 1971). See comment and photographs connected with exhibitions in data by EK, TS, BRob, and SC. SC has an urge to aid in the achievement of a balanced autonomy in society for a minority group through his art making. The images that he makes illustrate this need in an effort to solve the problem. See data on CD that illustrates this point. During discussion he has also mentioned achieving a sense of personal autonomy with society and within himself through his artwork. This would appear to reflect a healthy balance according to Csikszentmihalyi (1978) who adds comment that ‘selfhood is insatiable in its drive to confirm its existence’ (Csikszentmihalyi, 1978, p123) He feels that there is danger in people confusing physiological with existential needs and that this has led to the growth of materialism, which is a current threat to survival.

Iteration acquired the definition: ‘Repeated visits to the same place. Iteration with feedback = recursion.’ This is clearly evident in the art making process, when an artist repeatedly returns to an area of the work to make changes in order to clarify an image, whether during the process of preparation or interpretation, and during incubation and reflection when ideas and information are constantly revisited. As the latter three activities are shown to be interactive, then iteration may be seen as a unifying factor of the whole process. It is an aspect of the artistic creative process that
relates closely to discussion of scale and attractors above that rely on selection and focus, concentrated attention in order to allow the artist to create a balanced, whole artwork. (See discussion of EK’s work above and data on CD.)

Iterations occur in the process of creating layers of images mentioned by EK, SC and TS. TS talks of enjoying layering coloured pencils. Examples of the iterative process are found in the photographs in the data collection especially in those of TS, SC, and EK.

The notion of tension is also somewhat difficult to isolate in art making behaviour as it appears to be most important in providing a climate for the creative activity, and whilst not directly referred to by participants, may be inferred by their description of a build-up to actively making, as part of the immersion process, and continuing throughout the time of interpretation in order to hold the activity together. It appears to be another unifying factor of the whole activity. Flow has been retained as it relates to how the participants feel when the process is successfully moving along. It is a unifying concept relating to the whole art making process.

BR - But you don’t know how you’ve done it?
EK - Yeah. Well it’s a subconscious process. I can’t really say just how I do it because it just happens, but it all goes together. It’s what you’re seeing.
BR - Yes, so it’s, is it an auto - do you feel it’s a...
EK - It’s an automatic thing because I don’t visually think, right there are two eyes in the head and they go there and I do them. I don’t. I’m not seeing the person, I’m seeing shapes and colour and tonal values. And if you draw what - hopefully when you put down what you see, hopefully it does come together - well, it comes together depending on what shape, but definitely it comes together. Yes, so it is, it’s totally automatic for me. (Interview with EK: 219-224).

There is an obvious sense of frustration when the process does not flow.

TS - I don’t know. I, when I came in this morning I was a bit agitated because I’d had a busy trip up from Sydney, and I think that’s probably why I wasn’t really into it, and that’s, I think that’s probably quite a bit of the reason why the original one didn’t work, because I hadn’t relaxed. I wasn’t concentrating. I wasn’t into it. An I’m just looking and saying oh yes this colour goes here and that colour goes there. So I wasn’t really just letting it flow. So that’s what it was. So when the state of mind when I’m not really thinking I think is when I’m –
not consciously thinking ‘oh yes I’ve got to use blue, or I’ve got to use green’ it just happens (Interview with TS: 394-401).

An emergent pointer that has been remained throughout the synthesis is that of habit of process, since it has been a matter of regular comment by participants. The definition: ‘Habit of process activity’ is also relevant to INCUBATION / REFLECTION. In fact this element had a changing history within the data synthesis when it was eventually merged with Habit, and Habit Repetition, which had both gained the definition – ‘Repetition of a reaction to an experience’ in response to the comments by participants. The final definition -‘Habit of process activity- routine’ - encompasses these two definitions in judging the activity to consist of a combination of repetition of process activity as a form of repeated reaction to similar experiences, often resulting in the establishment of a routine. For TS an awareness of habit, or routine means the need to consciously initiate breaking routine, as previously mentioned. Whilst EK talks of being comfortable with her medium and this means she does not have to think consciously about how to use it. It is a reflex action, a routine, automatic, leaving her free to concentrate on other things.

‘What part does your chosen art medium play in your creative process? I am comfortable with it so I don’t have to think about the mechanics of doing it’ (EK Written answers, 66-67).

BB discusses routine and habit of working that changes with an emphasis on individual memory. For example the use of outlines as a fallback, plus light and shadow because she is confident with their use.

BB - I think that’s because of what I’ve done previously you know. I’ve got a tendency to want an outline, and I sort of actively try to fight that from time to time (Interview with BB: 211-212).

And:

BB - I just couldn’t do it without the lines. That one. I really didn’t intend to do that but I just couldn’t cope with the feet and all that complicated arrangement of the feet and legs without doing it in that way.

BR - So d’you think you do, when you come across a problem, do you go back and revisit ways that you’ve solved these problems in the past?

BB - Oh Mama Mia.
BR - It sounds like it. If that’s a solution that’s come from work that you’ve done before it sounds as if that might be what you do.

BB - I think usually when there’s a problem I will usually do something linear to start with.

BR - Right.

BB - And then I might think afterwards think there’s a lot of shadow there, I might start from that shadow and work outwards from that. Put the lines in last or something, I don’t know.

BR - Yes so, well, is it a matter of confidence then?

BB - It is a bit, yes leaning on a crutch, the linear thing (Interview with BB: 234-249).

On the subject of habit, or routine:

BB - Well the routine is just that I start off with learning the um, learning the model, and if it’s a model I’ve drawn before it doesn’t take so long, but if it’s a new one its quite difficult to get into it.

BR - Yes, so what’s your approach to get into the routine?

BB - Well I think my routine at the moment is using thick charcoal and a thinner black pencil and a bit of colour, and some white, you know, and trying to put something together in that way. And then I develop the other colour out of that later. (Interview with BB: 313-319).

BB - Well I go through sort of - I can see I’ve been through phases, particularly with sort of background stuff, putting sort of circles of colour round things. That sort of thing you know. I’m not doing that at the moment. I can remember certain problems. I mean the head was a great problem at one stage, that I couldn’t somehow connect the head to the rest of it (Interview with BB: 337-341).

For BRob habit, or routine means ease and speed of access to a working state, and an awareness of emerging information from her memory, remembered habit of process.

BRob - Yes it is. I have to have developed a routine in class, because I get into it much quicker now than I used to and I must be doing something to get in there quicker. (Interview with BRob: 180-187).

And:
BRob - It must be, (memory returning) it must be mustn’t it, you know? When I first started doing (life) drawing and - this was at Dobell House - I remember thinking, now the deltoid muscle, for instance, that doesn’t go there, but I’ve really got to forget that and see what it looks like. But I think when you are doing sculpting you can - its coming in, obviously, because you know that it goes to that position, that particular muscle or whatever, it must.
BR - Its structural sort of information isn’t it. Its got to be coming out.
BRob - Its got to come out - even though my anatomy might be pretty rusty I think its probably still basically there (Interview with BRob: 454-455).

SC makes use of habitual routine in order to organise his daily activities, so that the different elements of the work are kept in a balance, accorded a balanced amount of energy.

SC – I think that’s enough. Just a basic idea of breaking it up – practical physical work in the day and write at night. That sort of leaves it fairly open. But I think it’s really important to have that sort of routine because it sets a framework. BR – For time, and energy?
SC – Yes, for time. Because if I start to muddle them up sometimes I’m everywhere, I’m not concentrating my energies on one thing for a sufficient period of time so that they both develop in unison. ‘Cos I’ve identified that discursive element as really important. It reflects what I do, and what I think (Interview with SC12-10: 321-328).

But he implies that habit of process may not be creative in art making, leading to repetition of work and lack of progress. He feels the need to be adaptable so as to keep going with a piece of work when materials run out.

SC – I think your ability to extend yourself continually, I think that would refine the process too, because you’re not relying on particular ways of doing things. I think it becomes really easy and contained. That’s when you develop an art practice that leads to repeating the same thing over and over again. I mean you can find that can be very fulfilling, but that’s what I work at. I’m trying to – I want to be able to use any piece of material that I can to communicate something. I think – because without those – in some conditions if you run out of materials, for instance a particular type of material that you’re used to working with then that stops the creative process, because you’ve run out of it and you have to wait
until you get some more. I think that just on an individual basis I think people try and respond creatively to the environment all the time. Just because you don’t have something it doesn’t mean life stops, you create something else and I think that ability to create something else is really important, to survival, just basic survival. (Interview with SC12-10: 305-317).

He makes full use of process habits, ‘Sometimes you can actually work through it, through processes that you’ve developed at other times, you’re extending beyond it…’ (Interview with SC: 12-10).

The experience of habit of process may be considered to link with the concept of Irreversibility, whose definition is that events are not repeatable. This could be taken as an assumption in artistic creative process, if it were not for the existence of habit of process, which implies repetition as discussed above. However it may be also understood that there is never an exact repetition of process, as, even if the artist repeats a technique of drawing or painting, the subject may vary, or there will be a different brush stroke here or there. We may also assume from the data discussed above, that the making will also be affected by the artist’s state of being at the time that the work is made.

Main Empirical Research Findings

These findings serve to address the questions suggested by the theory as mentioned above under the heading ‘Anticipated Results’ that were consequently applied to the data synthesis.

1. That there appears to be an individually orchestrated pattern of behaviour associated with art making that is self-organizing, not consciously orchestrated, involving the whole person.
2. That this pattern involves iteration and recursion, revisiting and adding to ideas, feelings and mental constructs and thence the interpretive piece of work until the artist stops work.
3. That deep concentration has peaks, but that the information gained at this time carries on into a period of relaxation immediately following such concentration.
4. That habit plays a big part in pattern building and may be consciously, purposefully initiated, controlled.
5. That it is possible to learn awareness of creative process.
6. That artists appear to feel in control of their creative processes whilst working, and that this not necessarily a conscious control.

7. That artists willingly, purposely, submit to this seeming lack of conscious control as a natural process aiming to knowingly incorporate all their personal resources into the art making process.

8. That there are elements of the process which whilst interrelated may be discussed and considered separately, for example context, habit.

9. That concepts taken from Chaos Theory have a place in discussing art making in many instances. Self-organization, iteration, attractors, scale, irreversibility, and sensitive dependence on initial conditions, are particularly appropriate concepts for use in discussing artistic creative process.

**Conclusions Gained from the Empirical Study**

It appears that the reflective part of artistic creative process is not an isolated element, a separate stage of a process, but interrelates with all other aspects of the process – as shown through the making of a whole art object. Contributing elements of the reflective – creative thinking - process appear to echo the diagram arrived at in Part A, illustrated on page 130 labelled ‘Elements of the Attentional Focus Process.’ In that diagram conclusions taken from the theory led to an emphasis on the component parts ‘concentration,’ ‘selection,’ ‘attention,’ ‘emotion,’ and ‘focus.’ The analysis of elements reached here however, following the addition of information from the empirical study, take us a little further, in that they are now a lot more detailed. The list now includes more reflective elements, such as tension, and takes note of contextual input, such as personal experience and environment.

Therefore a linear view of a creative cycle may be considered to be an extremely limited interpretation. The ‘stages’ interact in such a way that they may not be treated as totally separate from one another. The links and connections appear to be as important as the objects they link. Reflection occurs constantly during the making process. It is a descriptor that summarises the many interactive, interconnected layers of the network of activity occurring during art making (Hayles, 1991; Jones, 1996c). The ‘stages’ or elements of creative process are therefore perhaps best envisaged as interactive networks of activity, one not functioning without the input of another, one lighting up another, or many, as the process develops (Greenfield, 2000).
The *artistic reflective process* is the basis of art making and is one that involves an individual personal restructuring, an enhancement of identity through new understanding. The *reflective* skills themselves are those sensing, feeling, emotional and cognitive processes that are interrelated whole person *experiences*, combining previous *experience* with the new in a biologically evolving growth of understanding. Therefore there is a case for encouraging the development of such skills through which the *reflection* process occurs, in order to encourage individual development through art making.

The empirical study has contributed to a refinement of understanding of those elements that were considered in the theory of Part A to be components of the artistic creative process, also serving to add clarification of understanding concerning their interrelationships. The questions suggested earlier may appear to have been addressed by means of exploring the basis of the concepts that they suggest rather than directly addressing the particular questions, that following the research synthesis now appear somewhat superficial.

**INTERPRETIVE SUMMARY**

*Artistic creative process* appears to be a natural process, with meaning emerging from this *(flow)* of activity that leads towards a temporary sense of constancy or *homeostasis*, before the whole process begins again (Arnheim, 1996). But whilst the process is active, there may be more than one set of activities proceeding at the same time within the *(flow)*, integrating the *(flow)*. This may be considered, particularly when awareness, *conscious* or otherwise, is demanded of all aspects of constructing for example, a drawing; visual analysis and *interpretation*, line drawing following the demands of that *(interpretation)*, *memory* of each layer as it builds, and the interlacing effects of all those layers of each of the many colours and lines that are moved towards constructing an image to meet the requirements of the person involved. The concept of interconnected networks of activity aids comprehension of this construct (Greenfield, 2000).

In connection with the *reflective/incubation* phase of the *artistic creative process* there would appear to be a common thread of awareness at all stages of the process. This is of interest in light of earlier discussion concerning James and his
concept of awareness of the continuously changing states of personal *consciousness* (James, 1890a; McDermott, 1977). Even though the artist may indicate that they ‘switch off’ to surrounding activity while *concentrating* on their work, there is a sense of totality of involvement in the moment, in present time, coupled with a non-*conscious* understanding of what they are doing that does not cut out responses to their surroundings, but includes them. Acknowledgement of this activity leads to consideration of the view of human creative activity as one that entails whole person involvement in art making; of a profound sensitivity to living that is not located in one separate recognized sensory percept or another. This activity appears to provide an experience of personal oneness and freedom to make art that is *reflective* of that experience. There appears to be an embodiment of the activity, a synchronized interaction of mind and body and all senses, that *flows* into the work, which then reflects the level of involvement of the artist in their meaning-making process for all to see. The key to artistic creative process as a compulsive activity may be found in a basic human need for more information, which art making can supply, and that data from the artist participants in this research reflects a feeling of compulsion or being driven to make art (particularly EK, BRob, and SC Data). SC comments that the drive to creativity is one that is available to all as it is a survival technique (Interview with SC 12-10, and above). EK comments on the important part her art making has played in regaining and maintaining her health (EK Data). Similarly BRob finds it important in maintaining her health and BB feels it plays a big part in her attitude to life (BRob and BB Data). There is a marked sense of personal freedom experienced by the participants during their art making, possibly an effect of being present in the moment. It is perhaps, as suggested in Part A, a type of meditation, allied to the Buddhist conception of artistic experience leading to an awakened mind, whereby thought is free from *habitual* patterns of ego (Wallen, 1999).

Two important points have emerged regarding *habit of process*. One is that it would appear that *habit* relating to art making requires *conscious attention* to affect alteration in habitual pattern, the other that *habit* repetition can be both good and bad. It is good because it speeds up process, and bad because it inhibits process. It appears that those with an awareness of their process *habits* are able to affect changes, and make use of their *habit*-forming abilities (BRob, SC, SZ). The point is also made by SC that habit should not extend to the art product, because it results in repetitive, non-creative work.
There is an emphasis on individual *sensitivity to initial conditions* in relation to context and motivation in the area of *immersion/preparation*. Similarly it is clear that participants emphasize the part played by *emotion* in their processes, particularly in regard to *motivation* and *incubation/reflection*, but always affecting the process as a whole.

*Concentration* as part of the working *reflective* process presented an interesting phenomenon particularly evident in the study of TS. Her deep *concentration* led to the ability to express information gained in that time after the deep *concentration* level had peaked, suggesting that the depth of understanding of the information was held, at least for the length of time taken for two more pieces of work to be completed, approximately thirty minutes. BB also commented on this phenomenon in her work. Having experienced great difficulty in reaching a satisfactory level of *concentration*, after a period of deep study she was then able to relax and work freely without the need for such *concentration*. She commented on the experience of *concentration* ‘peaking.’ It is as if a clockwork motor is wound to a certain pitch and then gradually runs down. In relation to this phenomenon, Church (2000) writes of Kant’s account of aesthetic experience, that aesthetic appreciation ‘intensifies’ *consciousness*, a view that (Schiller, 1954) challenges in arguing for a greater role but one that would enlarge the point being made here.

Aesthetic appreciation may also be equated with that *feeling* of deep satisfaction on successful completion of an artwork or the satisfaction of solving a problem (EK, TS, BRob Data). McMahon (2000) equates the *feeling* of beauty to the feeling of solving a problem. Is this what the ephemeral idea ‘beauty’ means? Is this what a viewer experiences on observing a work of art? Is he or she able to instinctively appreciate an artist’s successful solution to a problem, or problems? Is this the meaning making that is recognizable to the uninitiated or knowledgeable alike?

It would appear that the *reflective* element of the *artistic creative process* is an intensely personal *experience* that is activated to verify/validate individual identity. It appears to be a natural process in which artists profess trust in providing them with an experience of their own particular truth of the moment. Artists’ belief in this process leads them to consider it an escape from the stresses of everyday living in some cases, one that allows them respite to revisit, re-establish a personal natural *balance* or *homeostasis* within their living worlds, albeit a temporary state. Simply, they feel better.
after making art, and are possibly better able to identify problems in their lives that they feel more able to address.

If art making is understood to encourage an individual facility to be able to constantly balance life, then this is a valuable asset, a skill to teach people. The ability to reflect, to relax into making and allow the mind to seek a natural balance is a skill that is incorporated in learning to make meaningful art objects. Through concentration the mind appears able to search for links and connections associated with identity in a deeply satisfying individual balancing exercise.
INTERREGNUM TWO
A SECOND SUMMARY COMMENT

The empirical data synthesis appears to have supported one important conclusion that could be made about the artistic creative process taken from the theory of Part A. It is the difficulty in separating one ‘stage’ of the artistic creative process from another. Perhaps the only separate activity is the initial one of immersing oneself in subject matter in order to begin making art. Choice of materials and methods of work follow, and the rest of the process flows from there, consisting of elements that may be distinguished from one another, but that are so intermingled in activity that they are best considered in relation to one another because any form of analysis of the artistic creative process is an attempt to understand the many implications of their interactive influences. Further, it would appear that in the artistic creative process there are no levels within its structure. There appears to be no separation of activities into layers, but a streaming flow of interaction with short, temporary focus on one moment of time and making, on one aspect of the activity of art making that bubbles forth to the surface, that emerges dynamically as a result of the energy created by the interaction of parts. This process would reflect the description of networks or the concept of nesting accorded to the activity of the brain mentioned in Part A.

It would appear that art making is an emergent property of the whole person which serves as evidence of the combined interactivity of brain and body in creating a ‘mind,’ a consciousness, that reflects knowing and meaning gained from the activity and which changes from one moment to another, continuously. There is a possible assumption taken from the data that this activity may be beneficial to the maker as it encompasses the person holistically in an attempt to reach a balanced whole. Therefore encouragement of the use of this process, as an avenue of personal exploration, of personal affirmation of identity, is an extremely important potential aspect of art teaching.

Emphasis on art making process would appear to be important in teaching art making, incorporating those elements that have been discussed above as components of the process. There is an indication that recognition or incorporation of the elements disclosed in the data synthesis discussed above, in any consideration of artistic creative process, will enrich and elucidate that process, because they all appear to function at
their best when working together. For example, without learning about a topic / subject matter, in relation to art making it becomes an exercise in learning about materials, with no reference to why there is a need to do so, indicating a superficial interest, or a lack of substantial motivation. Or, without extending a person’s ability to concentrate on any aspect of the process, it is likely that they will not extend themselves by becoming totally involved. So saying, there is an obvious corollary that each person inevitably works within his or her own individual capabilities.

Metaphorical use of Chaos Theory concepts would appear to elucidate aspects of the art making, artistic creative process, and in so doing they extend our understanding of the interrelatedness of all component parts, by offering a self-organizing framework that allows restructuring of boundaries to occur concurrently with change in other contributing elements of the process.

The results of this study may also be used as a guide to elements of creative process that are an adjunct to any model of the artistic creative process, in that they offer elements of process that are believed to influence art making. Models relating to creative process, like those of Kolb (1984) and Mumford (1998), mentioned earlier may make use of the information that this study provides as reference in extension of their models.
PART C: ART EDUCATION IMPLICATIONS
CHAPTER SEVEN
ART EDUCATION AND EDUCATION THROUGH ART

“We are only limited by what we are prepared for. If you open your eyes and mind and be prepared to see as well as look a whole new world awaits.”
Patricia Smith - from her research notebook 1997

In order to explore the possibility of links between art education and the material presented in Parts A and B of this study it is necessary to look to the subject of art education. The topic of teaching creative process is mentioned earlier, particularly with reference to creativity, here it is intended that the creative process of teaching art making be considered.

Art education has gone through many changes relating to the prevailing pedagogical and political influences of the time. Traditionally the arts have been central to learning, providing education of the senses, of thought and understanding, with no need to justify their place in people’s lives. Art making evolved from the times of our early ancestors, such as those who painted images of their lives in the caves of Lascaux and Altamira (Gombrich, 1972). Music making, dance, and story telling evolved at the same time. In medieval times of learning in monasteries, writing and picture making were to be found cloistered with musical composition and performance. Ideas were developed by people who illustrated their thoughts through dramatic poetic productions, in paintings or maybe sculptures, in public places, or in private. In churches, palaces or private homes, through all forms of design, and image making, art has been with us in myriad forms continuously, throughout human history as a focus for communication of ideas and understanding. In recent times people may argue about whether something may be ‘art’ or ‘craft,’ ‘expert’ or ‘amateur,’ but there have been artists of all types developing ideas through artistic means on every scale, producing interpretations of all kinds, within a multitude of materials and modes of production, enriching our lives, supporting and encouraging mankind through the changes that have been experienced throughout our history (Gombrich, 1972).
Ideas on Art Education Since World War II

Recent trends in the United States of America, in the United Kingdom and in Australia relating to the development of ideas on art education appear to have been similar to one another, and educators appear to have been experiencing similar problems.

Internationally, Art Educators since World War Two have considered education through art as a possible alternative, or as an adjunct to other educational structures (Eisner, 2001; Read, 1958). Read was instrumental in forming the International Society for Education Through Art (InSEA), which was initiated following the Second World War. It was formed as a result of UNESCO’s resolutions in 1946 and 1947 to inquire into Art Education. Read was appointed chairman of a ‘Committee of Experts’ at the UNESCO art education seminar in Bristol, England, in 1952, which was followed by the formation of InSEA in 1954. This is still an active worldwide organization promoting education through art. Running parallel with these activities Read (1958) was writing in support of his thesis that art should provide the basic paradigm of a structured educational system. Read referred to Plato as the originator of this theoretical function of art, and believed that Schiller writing in 1794/5 was the only follower of Plato to give it serious thought (Schiller, 1954). Schiller posited an intermediary domain of activity that mediated between the sensuous and the rational resulting in the impulse called ‘play.’ This he related to aesthetic education, by means of which a person may rationalize the sensuous through reconciling freedom and necessity, a condition of balancing ambiguity that also receives reference throughout literature on the creativity and the creative process (Audi, 1999; Goerner, 1995; Hayles, 1991).

Read (1958) considered that education should proceed by developing a person’s individuality, that in this way they may become of most use to their community, and thence contribute to the development of the “organic wholeness” of the society to which they belong (Read, 1958, p.5). In this light, art education must provide both a process of individuation and of integration of persons. Read explains that art making addresses ‘the total psychic development of the individual’ and thence ‘our common collective being’(Read, 1958, p.93).
Recent Art Education Developments in the USA

Art education has had a chequered history along with all other ‘subjects’ and ‘disciplines’ taught in varied educational establishments. Educational movements have influenced the development of the current ideas of art education (Geahigan, 1992). Of principal relevance to this present work is that from the 1960s to the present time there has been a trend towards considering the relationship between cognition and the arts. For example, Nelson Goodman was interested in the symbolic nature of the arts, previously addressed by Cassirer (1944, 1959) and Langer (1953, 1967, 1957). Goodman (1976) contributed ‘a theory of notationality,’ that explained his idea of how symbol systems function, and described the principles underlying their construction. Through this theory he precisely characterized different art forms according to his ideal notational system, and was able to compare the different symbol systems used in all the various learning domains. Geahigan (1992) considers that Goodman’s ideas have been a great influence in the area of arts education, in combination with his work at Harvard University’s Project Zero, where, in 1967, he brought together psychologists, philosophers, and educators interested in basic arts education. Initially “Project Zero focused on the nature of artistic knowledge and the ways in which artistic skills and understanding can be enhanced through well-designed programs in schools and museums” (Gardner, 2000, p. 245).

Investigators connected with Project Zero have explored areas such as “artistic and aesthetic development of children, aesthetic perception of works of art, problem solving and creation in the arts, and practical problems of curriculum construction and evaluation, often using Goodman’s theory as a conceptual basis” (Geahigan, 1992, p. 15). Howard Gardner and David Perkins were co-directors of Project Zero until 2000, currently remaining two of the six major investigators in an ongoing research organization (Zero, 2001). One of the main areas of exploration has been that developed by Gardner (1983) through his theory of multiple intelligences. This theory points to seven major areas of human intelligence. These are linguistic, musical, logical-mathematical, spatial, bodily kinaesthetic, interpersonal and intrapersonal.

In 1972, David Perkins produced a report for the Office of Education concerning ‘Basic Abilities Required for Understanding and Creation in the Arts,’ which was an assessment of Project Zero’s work. This report contained work in the areas of cognitive psychology and psychologically informed philosophy, very new to educational thinking,
particularly that of the arts, whose world had been considered to be that of the ineffable.
The researchers were developing a ‘level playing field’ for all disciplines by pointing out that all skills and abilities of the human learner were used equally in all subject areas (Geahigan, 1992).

It is interesting for the present study to note that, in keeping with discussion on the processes of the brain, noted in Part A, Goodman “was particularly enamoured of work on brain damage that provided unexpected support for his theory-based distinction between notational and non-notational work” (Gardner, 2000, p. 248). He also saw the need for direct contact with artists and audiences in order to develop his research.

Developments such as these, concerning thinking about intellectual phenomena underlying the arts, led to further investigations relating to cognition and intellect concerned with the arts. There has been a concerted effort to raise the profile of arts education, to re-establish the validity of studying the arts, and to bring about a reconsideration of the role of the arts in the educational curriculum as a whole (Geahigan, 1992). Project Zero continues to this day with a broader educational brief, although “basic research on artistic knowledge and practice remains a defining feature of Project Zero today” (Gardner, 2000, p. 245). Project Zero’s current mission statement declares that it wishes to “understand and enhance learning, thinking, and creativity in the arts, as well as in humanistic and scientific disciplines, at individual and institutional levels” (Zero, 2001). The research programs now cover many areas relating to learning and teaching styles and strategies, including Gardner’s theory of multiple intelligences, and various creative thinking stratagems. The direction of investigation has also moved towards exploring how the research programs have affected the business world (Zero, 2001).

In the mid 1980s Gardner began running an art education experiment called ‘Arts Propel’ (Gardner, 1990). It concerned three areas, “production, perception and reflection” and:

- represents an attempt to go beyond “sheer production” in arts education and to expose students to formal and conceptual knowledge about the arts as well.
- The research group worked with middle and high school children of Pittsburgh Public Schools in the areas of music, imaginative writing and visual art. The initial goal of this project was the development of new forms for assessing the growth of artistic intelligences (Gardner, 1990, p. 44).
But the discovery was made that students needed to work with materials intensively, to become familiar with their potential. This led to incorporation of more specific curricular considerations into the project. The educational efforts were designed to involve making an artwork, “the discrimination of important features in works of art, and the ability to stand back and reflect upon the meaning of artistic works – those created by others and those created by the students themselves” (Gardner, 1990, p45). This was done by means of ‘Domain Projects’ and student portfolios so that the melding of production, perception and reflection may be encouraged. The portfolios were envisioned as work books containing information relating to the work in progress, and were to be used in assessment. The assessment component of Arts Propel therefore is one that takes into account the student’s ongoing artistic activities as documented in the portfolio. Developmental templates were produced for assessment of levels of competence regarding knowledge and practice dimensions that were considered important by chosen experts in the field (Gardner, 1990).

The use of portfolios as assessment tools revealing the structural foundation of a student’s developing work has evolved into a practice incorporating ‘process diaries’ in the Australian High School system. However they are used for internal assessments only and they are as yet only referred to by external assessors at times of assessment controversy (Board of Studies, 1999). The product still receives the primary assessment rather than the process through which it was developed.

It was believed in the Arts Propel project that historical, critical, and philosophical considerations should arise from the students’ art making. The aim was to build a model that sought to synthesise forms of knowledge across the curriculum. Gardner considered Arts Propel to be an example of the Discipline Based Art Education (DBAE) form of teaching art that was under consideration by art educators connected with the Getty Education Institute for the Arts. He points out that there are no explicit guidelines for such qualification put forward by the Getty Institute, and considered that as “it was a contemporary effort to create an arts education that encompasses the forms of knowing important in the arts and to do so in a way that fits current knowledge about human development and learning,” then it qualified as DBAE. He believed also that “superior art education is most likely to emerge as a result of accumulated knowledge about what works and what does not work under a variety of settings” (Gardner, 1990, p48).
Gardner comments that unless the teachers are in sympathy with curricular materials then the research efforts will be doomed. In noting that teachers have different values, some wishing to enhance, for example, expression, and others basic skills, he acknowledges that they offer different valuable kinds of education, but he would still seek to offer a uniform set of values for mankind as a whole. He also considers that the three main elements for a successful art education program are viable curricula, materials, excellent teacher training, and suitable modes of assessment. He also comments that much can be learned from observing teaching practice in worldwide settings, for example the work that he did in China influenced his own thinking (Gardner, 1990).

The DBAE was an initiative of the Getty Center for Education in the Arts (now named the Getty Education Institute for the Arts) in 1984 that began with particular aims in mind for reforming art education. Eighteen districts in Los Angeles County participated in the research and development effort funded by the Getty Center for Education in the Arts (Rubin, 1997). It is a method of teaching that gives the background, meaning, intent, social and historical influences behind historically sourced works of art, and the artists who created them. This progresses to practical work by students made in relation to the study. Begun nineteen years ago, it has evolved in theory and practice in that time (Delacruz and Dunn, 1996). It has stood the test of time, according to a selection of evaluators, due to its evolutionary character, and an ability to deal with concerns raised in the field (Delacruz and Dunn, 1996; Rubin, 1997; Wilson, 1999). It has been a source of hands-on ongoing research, directly relating to work in the field. The newest ideas in DBAE incorporate discovery, interpretation, hands-on inquiry into each of the four integrated art disciplines of studio art, art history, art criticism, and aesthetics, and the development of new means of assessment (Rubin, 1997). However, “comprehensive study of works of art and the expression of meaning are the core” of the system (Rubin, 1997, p. 45). This is not the core curriculum suggested by Becker (1989), who, as a practicing teacher, put forward reasons for a basic practical and theoretical curriculum. Teaching experience lead her to believe that students at tertiary level were not articulate enough to explain the meaning of their work.

Delacruz and Dunn (1996) question whether DBAE may change with the times and maintain its coherence as it broadens its parameters. They also question whether
funding from the Getty centre is the main motivation for continuation of the scheme. However, they conclude that DBAE has at least caused debate, and energized the field of art education scholarship, thereby making a considerable contribution to the arts.

Efland (1996) does not appear to support the DBAE experiment, considering that this discipline based curriculum was based on cognitive psychology, and that “people tried implementing such curricula by writing behavioural objectives, specifying precise outcomes,” which went against the freedom that discovery learning was all about (Efland, 1996, p.54). He considered that it was necessary to understand thinking and feeling as aspects of cognition in relation to art education, in an atmosphere of exploration and discovery, and that these considerations were lacking in DBAE.

However, despite dissenters, the system endures, and the current Getty Institute web site offers curricular ideas and disseminates information for access by all art teachers. There is a continuing exploration of the possible curriculum developments shared by teachers who visit the ArtsEdNet mail web page. Here teachers share ideas and information directly relating to their art teaching practices, an invaluable means of contact and discussion (Getty, 2002).

More recently, research emphasis in North America appears to have been concentrating on showing how the arts may make a difference through arts-integrated curricula. The ‘Champions of Change Report’ containing reports on a variety of research projects from a variety of sources, points out that experiences in the arts serve to enhance learning and achievement particularly obvious in ‘levelling the playing field’ for those from disadvantaged backgrounds (Fiske, 1999). According to the executive summary of the report to be found on the Arts Education Partnership web site, this effect is considered to be due to the fact that when taught well, “the arts provide young people with authentic learning experiences that engage their minds, hearts, and bodies. The learning experiences are real and meaningful for them” (AEP, 2002). The report goes on to say that: “While learning in other disciplines may often focus on development of a single skill or talent, the arts regularly engage multiple skills and abilities. Engagement in the arts nurtures the development of cognitive, social, and personal competencies” (AEP, 2002). The Arts Education Partnership, formerly the Goals 2000 Arts Education Partnership, formed in 1995 in the USA, is a coalition of arts, education, business, philanthropic and government organizations that demonstrates
and promotes the essential role of the arts in the learning and development of every child and in the improvement of America’s schools (AEP, 2002).

Another evaluative review of recent research recently held in the USA with the title ‘How the Arts Contribute to Education,’ was commissioned in 1996 by the Association for the advancement of Arts Education (Seidel, 2002). The review covered studies held since 1983, involving more than 350 researchers, involved 2 million students, 35,000 teachers, and 20 international business leaders. It was a review that related to those ‘skills and competencies identified as necessary for work and school’ (Seidel, 2002). These are four in number:

- Basic abilities. In early grades the arts help develop basic mental and physical capacities that allow students to learn and live better.
- Ways and means. Participation with the arts helps students develop methods and habits of mind that help them succeed in many areas.
- Knowledge and skills. The arts themselves are important to understand—they surround us everyday—and when connected with other subjects, they can make learning easier and more meaningful.
- Working and connecting. The arts teach students ways to connect and communicate with others in our society, critical skills in our connected world (Seidel, 2002).

This review supports the need for including the arts in education for all students. Programs deemed most successful were those that:

- are school based,
- have a sequential curriculum in the arts,
- include schools arts specialists,
- include community arts and arts organizations,
- include a clear assessment component,
- connect the arts with other subject areas in the school (Seidel, 2002).

The research reviewer concludes that hundreds of well documented schools and community arts programs around the country indicate that the arts are a valuable element of education, and that all we need is commitment to help them succeed.

Currently, Eisner (2001), also connected with the InSEA organization, is disturbed by the fact that Art Education in the USA is developing a curriculum that appears to be gravitating towards only teaching art criticism, ‘visual culture,’ at the
expense of art making. The argument for ‘visual culture’ is that it may be more ‘socially relevant’ in this century (Eisner, 2001; Gardner, 1990). As a study in popular culture that reveals socially relevant information, a study of the culture of fine arts would illustrate the social status of the art produced at the time, a study reflecting the arbitrary values of the time. The “politics of the context” provide the forces that influence a culture’s “taste”(Eisner, 2001, p.8). Eisner (2001) seeks to support the value of art making as providing an experience of art that most involves the whole person, and it is one of the ways in which humans come to individually represent their world. The pressure by education authorities to conform to uniform accountability in provision of art education has produced a set of predefined outcomes that are restrictive to both creativity and individuality. The creative process requires working to no set outcomes; in art making evidence of ambiguity is often the indication of true creativity.

As evidenced in our earlier discussion, the values connected with an artist at work reflect a personal involvement with materials, with ideas, thoughts and feelings resulting in a piece of work that reflects their individuality and current state of being. Eisner (2001) also points to the joy of making and seeing art, and suggests that teachers want to present this experience of a particular quality of life to their students. Art making is a special experience, like no other, that brings a person into close physical contact with paper, clay or any other medium, encouraging them to work with it, to enjoy touching and handling materials, evoking feelings and emotions, and, while making, seeing the relationships of line, colour and form as a means of making images that are their own (Brown, 1999; Dewey, 1934). Kindler (2000) points to the enjoyment of learning simply to appreciate the environment, to learn to see what we are looking at and wonder at the experience of all that is around us.

Art serves as a language conveying meaning that is produced by a particular individual, the resultant artwork varying in its use of materials and modes of production according to the individual concerned. The understanding and appreciation of others’ work that art making fosters offers deeper insights into the meaning making of others than any course that concentrates on art criticism alone can possibly provide. The touch and feel of materials, and the links that these sensual experiences form within a person’s understanding offers a learning process similar to that of the traditional master craftsman or woman, apprenticed and experienced in the translation of ideas and concepts into wooden, ceramic, leather or other materials (Dewey, 1934).
At this time, perhaps no less than in the history of schooling generally, there is an emphasis on convergent rather than divergent thinking in schools in the USA that Eisner (2001) considers restrictive, but that may be countered by teaching art making. Learning to think within the constraints and affordances of a medium, learning to exploit the unanticipated opportunities that unfold in the course of doing a painting or a collage, making judgements about relationships that are rooted in one’s own somatic experience, entertaining alternative solutions to a problem and judging their respective merits- these processes are central to the making of visual art, and I would not like to see such opportunities compromised because from my perspective they stimulate, develop, and refine among the highest and most sophisticated forms of human cognition; they marry thought and emotion in the service of meaning. They help us to learn to see and to feel what we see. The arts are eye openers (Eisner, 2001, p.9).

The concept of art making as a way of knowing that extends a person’s ability for meaning making finds support in the work of (Solso, 1994, 2000). The quality of personal involvement in art making has been explored through the study of brain patterns by Solso (2000). In experiments which isolated the brain patterns of people drawing portraits it was shown that the thought processes involved in building knowledge of subject-matter equate with use of different parts of the brain from those used when a more experienced person is at work. The results of these experiments indicate that a more experienced artist may work more efficiently than a beginner, not needing to go through as much, if any, initial processing of a visual image. The novice deals with features at a certain level whereas the more experienced artist looks for meaning. For example in portraiture “the novice seems to be ‘copying’ the face; the artist is ‘seeing beyond’ the features” (Solso, 2000, p.83). The experienced artist showed more brain activation in the part of the brain:

usually associated with more complex association and manipulation of visual forms…the artist thinks forms rather than sees them’ and appears to be engaged in a ‘higher order’ interpretation of the face and may be relying on an abstracted representation of the face” (Solso, 2000, p.83).

Solso writes that this is consistent with the artist’s impression of his thoughts at the time of drawing, and wonders whether different artists think differently, and whether this may vary according to the subject-matter that they work with, whether landscape and abstract artists for example would exhibit different brain patterns. Solso (2000) suggests
that such studies, perhaps longitudinal ones, may lead to a better understanding of learning processes. However, in connection with the form of the present work, it is important to note that Solso’s work supports the view that art making develops a person’s abilities in an area of thinking and meaning making. Also this would perhaps explain why learning artistic creative process through art making may foster a deeper understanding of other artists’ meaning making, as opposed to a system offering only analytical art criticism courses. An experienced art maker may recognise elements of their own experience of the process in others’ work, and in identifying these properties better understand their visual language. Such studies may offer support to the concept that there is a need for art teachers to be practicing art makers in order to better comprehend the various possibilities available to their students. This is not always the case among teachers of art. Evaluation of work results from teacher recognition of the evidence of pattern of process within the artwork.

The work of Solso (1994, 2000) would appear to offer substantial support for theories suggesting that art making leads to development of cognitive capabilities. Hamblen (1993) discusses the possibilities, commenting on the rationale of instrumental outcomes in relation to goals for art programs. She feels that there are indications supporting links between learning in art and other subjects, and that art study can encourage creativity, skills of critical thinking, and academic achievement. Hamblen (1993) considers that this perhaps works best when art programs function in their own right, when it is necessary to facilitate instrumental outcomes, and when there is an awareness of the skills that art learning has to offer. However the position of the arts in relation to more ‘academic’ subjects may always be in question and Eisner notes “that while one day we might find that more experience in the arts boosts academic performance, at the moment there is no body of research that supports that general conclusion” (Eisner, 2001, p.7). The transformation of “a productive young artist’ into an analytical spectator, through the sole study of art as criticism, is of great concern to Eisner, who proposes instead that the arts become “a core paradigm for the rest of education,” as they are “enhancements of life” (Eisner, 2001, p.10).

Current research into arts education as exhibited in arts research journals would appear to be exploring the areas of the arts and academic achievement, for example an issue of The Journal of Aesthetic Education is dedicated to discussing aspects of this question (Vol.34, 2000). Another direction is that of following the earlier path of
exploring the connection between cognition and the arts (Geahigan, 1992). For example Sullivan (1999) is interested in the communication of information and meaning in the arts. Rather than dismissing reductionist forms of analysis he links them with more complex explanations of events by suggesting a consideration of scaled patterns as found in nature. Sullivan links process and product through practice, whereby cognition as process relates to the ongoing cognitive activity during art making. His concept of cognition as product is understood if one realises that art artwork is only true to a moment in cognitive time. It is the sole product of the cognitive construct of that moment; this Sullivan (1999) terms ‘transcognition’ as a means of describing cognition as practice in art making.

Art Education in the UK

A short summary of the situation of art education in the U.K is provided by Hughes (1998). In a presidential address to combined INSEA/NSEAD (National Society for Education in Art and Design) conference in 1997 Hughes (1998) put forward a personal view of contemporary secondary school education in the U.K. He considered that his experience appeared to be similar to that of conference delegates from a number of countries that were coping with the limitations of centralized national, state, or regional curricula. He considered the National Curriculum in Art to be constricting and to have changed little over thirty years, bearing little relevance to the world inhabited by youth of today. Also, and importantly, it offers little by way of challenge or preparation for the world of the arts at tertiary level. The problem falls in the area of preconceived objectives that do not allow for changing concepts or experimentation. Contentious political issues appear to be avoided, and the culture of the school dominates teaching and learning (Hughes, 1998).

Hughes (1998) considered that the National Curriculum provides no real guidance for teachers, who carry on from that which was taught before with little recourse to the work of contemporary artists. Hughes points to the need for “clear redefinition of the purposes and parameters of art education” continuing by saying that: “We have to abandon the conceit that art is different from everything else in the curriculum – a special case that deserves special treatment” (Hughes, 1998, p.47). He suggests consideration be given to the many models that may be developed from numerous available pointers, and fresh research could test various rationales that have
not yet been considered. He points to the lack of both criticism and aesthetics in U.K. curriculum, when they are included elsewhere, and such considerations may contribute to both the rationale and the content of the art curriculum.

Hughes (1998) also reflects that there may be a case for considering that any change should be affected in relation to the schools rather than the art curriculum, that rebalancing of curriculum as a whole may be considered, and, in so doing; raise the profile of art education.

**Art Education in Australia**

It would appear from Australian reports relating to arts education that the main problem faced by arts educators, hindering development in the arts, is that of a perceived need to justify their existence in the climate of an economically driven political agenda (Botsman, 1985; Coulter, 1995; Strand, 1998). There is only one politically correct view of the arts, which is that of a profession generating income. This is an assumption reached by John Coulter, (Chairman of the Senate Environment, Recreation, Communications and Arts References Committee in October 1995) on reading the Australian Government Paper ‘Creative Nation: Commonwealth Cultural Policy, October 1994’ (Coulter, 1995; Australian Department of Communication and the Arts, 1994). However, to look only a little deeper than the political skin overlaying government action, among the populace there is much evidence of a need for participation in the arts at every level, be it ‘professional’ or ‘amateur.’

In his introduction to the Arts education Senate Report of 1995, John Coulter states his opinion that ‘Creative Nation’ ‘concentrates on consumerism and product creation (Coulter, 1995). He suggests that the National Curriculum for schools and other educational initiatives appear to be an “attempt to squeeze artistic activity into a restrictive mould, a mould determined by vocational training” (Coulter, 1995, p. vi). Another influence on government perception of the status of arts education was afforded by the amalgamation of universities with formerly independent art schools and conservatoriums. This tended to emphasise the need for arts to conform to ‘academic’ standards motivated by economic rationalism. The 1995 report found that there is an emphasis on measurable outcomes rather than on creative process. “The implications of this, if implemented uncritically, are a fair cause of concern for the arts educators (and, we suspect, many other educators) who say that in education the process of coming to
understanding is as important as the product” (Coulter, 1995, p. 135). A submission by Dr Neil Brown is quoted in reference to this point – “Art and music teachers know that the difference between the playing of a simple melody in music, or the making of a gestural mark in visual arts at a high level, and those of performances at a low level is usually expressed in students by the exercise of hidden understandings” (cited in Coulter, 1995, p.135).

There are numerous areas of contention relating to the situation of arts education in Australia that are raised by this report. They are well supported by submissions from many organizations and individuals connected with all areas of the arts in Australia (Coulter, 1995). In order to readdress the balance of arts versus economy there appears to be a generally felt need for re-assessing the place of the arts in society. The 1995 report goes a long way towards addressing this need, but unfortunately its recommendations have been seen to have fallen on the ears of a government which has not so far responded to this call for change (Richardson, 1999).

The result is that a great deal of dissatisfaction is felt by arts teachers who conscientiously wish to fulfil their obligations to the best of their abilities, but need the support of a strong art educational structure to do so effectively (Lee, 1997; Richardson, 1999). In an article that is similar in its show of dissatisfaction to that of Hughes (1998) discussed above, Lee (1997) points out the failings of the ‘Curriculum Profile for Australian Schools of 1994’ (Curriculum Corporation, 1994). Its shortcomings, and those of the supporting theoretical ‘Statement on the Arts for Australian Schools’ consist in the main of a wordiness that explains little by way of what is expected of the art teacher. There are “three definitions of art – as symbol systems, as aesthetic experience, and as social and cultural perspectives” but no bibliography offered in support of teaching in these areas (Lee, 1997, p.22). Lee emphasises the need for basic education that may be built upon by the individual. It is a question of giving people the basics of a language, which they may then go on to use in artistic expression. He also contends that there is a need to establish standards by which art works may be evaluated, because the push for ‘expression’ for expression’s sake that clearly exhibits a lack of content is disturbing to the conscientious teacher.

Lee (1997) also points to the fact that those students who may excel in the arts finding not enough challenge in such a situation, as there should be if it were understood that an artist is one who needs an encyclopaedic knowledge in order to feed
the best creative ideas. According to Lee (1997) the pedagogical structure of other subjects tends to be lost in the art room, where teachers create their own programs. However he emphasises that diversity does not indicate creativity, and that ‘creativity’ and ‘expression’ are meaningless goals just because they cannot be meaningfully assessed. “The art class is continually in danger of collapsing into a session of supervised play” (Lee, 1997, p. 24). He believes that currently “the art class provides an experience that compares badly with other subjects, both with regard to its educational probity and the reliability with which it rewards merit” thence nothing of value appears to be taught in the classroom (Lee, 1997, p. 24).

The scaling down of marks in relation to maths and science subjects in Australian high schools shows the low status of art, and Lee questions why art teachers have let this situation happen. This comment by Lee is perhaps further evidence that reviews and reports fall on deaf ears among legislators. The recommendation by the Review of Arts Education and Training of 1985 that “a review should be established to define the competencies needed by art teachers at all levels of schooling” would perhaps have offered some levelling of the art teaching playing field, but it is perhaps another recommendation that has not yet been attended to by the government (Botsman, 1985, p.111).

Perhaps a wind of change that would affect the whole art education situation in Australia should come from the top down. The more recent ‘Research in the Creative Arts Project’ (Strand, 1998) is a joint study of the Australian Council of University Art and Design Schools (ACUADS) and the National Council of Heads of Tertiary Music Schools (NACHTMUS) funded under the Department of Employment, Education, Training and Youth Affairs (DEETYA) Evaluation and Investigations Program. It was intended as a project to “undertake a comprehensive study of research outputs in art, craft, design, music and drama in order to develop a set of performance indicators and weightings in the creative arts” (Strand, 1998, p.xiii). The project required initial consideration of the importance of the creative arts in Australian Society. The resulting report recognised that:

The creative arts are a key contributor to the development of an Australian culture that shapes both our individual and collective identities. The arts are dynamic, reflecting the changing socio-political climates, adding to our understanding and appreciation of our culture, shaping our values and
attitudes, while supporting spiritual and material development (Strand, 1998, p. 11).

The Australia Council submission envisages arts education as:

- enriching and empowering – arts education plays a key role in the socialization process and in introducing students to imagination, experimentation and problem-solving, producing perspectives that are central to defining Australia’s role in the emerging global economy and culture (Strand, 1998, p. 12).

The report notes that the place of creative arts in universities in Europe is traced back to medieval times, intrinsic to scholarly communities. However, in Australian Universities the creative and performing arts are relative newcomers, evolving through organizational changes during late 1980s and early 1990s due to the ‘Unified National System’ that caused amalgamation of Universities and Training Colleges (other than Technical and Further Education and Community Colleges). The Strand Report places the arts strongly in the academic arena, recommending that research should be carried out on development of performance indicators for the Creative Arts. The areas of staffing, funding, research equivalence, and publication are all areas dealt with in the Strand Report. They are areas that reflect on the capacity of the arts faculties and departments for attracting funding to the universities. The relationship between professional practice and research is considered in the Strand Report, allied to the question of performance indicators. Data on Publications tends to be one performance indicator relating to arts research, the relationship between research and professional practice in the arts another important consideration. Detailed categories and weightings are suggested by the report as appropriate, reliable measures for the creative arts. These are intended to encourage and enable monitoring of creative arts research with some accuracy, and provide a means of ongoing evaluation of arts research (Strand, 1998).

**TEACHING ART TODAY**

All available research into arts education appears to indicate that it should be recognised by society as being of great value to mankind, that it needs to be structured in such a way that it is on equal footing with other disciplines, and that this requires a structure that accommodates all aspects of artistic activity, including history, aesthetics and criticism, learned alongside or through creative making. At the same time such a structure should work towards enabling students to become independent learners;
through a student’s approach to learning rather than relying on assessment of an end product to determine a student’s development. The creation of adequately structured arts learning environments is an ongoing process that relies on governments to consider recommendations offered by such research reviews as those noted above. In the meantime, however frustrating it may seem for art teachers to feel isolated and without support, it is also important to note that change happens naturally at grass roots level due to the actions of teachers working closely with students (Belenky, Clinchy, Goldberger, and Tarule, 1986; Clinchy, 1989; Emery, 1989; Galotti, 1998). They are in a powerful position because they are at the actual interface between society and art makers, where theory and politics may often be forgotten in actually making art. That which may be accomplished in a classroom by one teacher will affect the hundreds of students that he or she teaches in one week, changing their lives even a little by adding to their experience (Belenky et al., 1986). Freedom to set one’s own syllabus does not necessarily mean isolation; when we now have the means to communicate all around the world via the Internet, and share ideas, disseminating knowledge (Getty, 2002).

It is important to note that there is evidence in the research noted above of a need for natural balance in gaining information through different forms of knowing, and that “the different forms of knowing are learned better as parts of an integrated whole” (Gardner, 1990, p.32). This would indicate that the unifying discipline of art making may serve as a basis for the whole spectrum of learning to take place. That is because, if the creative process may be understood, particularly through reference to Chaos Theory, to be the way that we learn, then this is provides a unifying factor across all disciplines and all form of learning. Understanding is achieved via this human creative process; therefore it is a key to teaching and the link between all areas of knowing. It is the ‘HOW’ of all subjects and disciplines at an individual level. Further, an understanding of self may be gained by learning about one’s own creative process that will facilitate learning. Individuals’ stumbling blocks may be identified, thus allowing them occasion to address learning problems and anticipate, and therefore cope with future hurdles. Arts education leads to learning about learning processes through doing and making, through experience (Dewey, 1934).

Learning by experience plays an important role in Read's (1958) more speculative theories on art education that incorporate nonetheless the basic tenets
discussed in Parts A and B above, concerning the artist’s search for balance and
homeostasis, concluding that it appears to take place primarily on a non-conscious level.
Again echoing that discussion Read (1958) explains that the process occurs, “Below the
level of consciousness, and extending to a level of experience which is more than
individual, a wider and deeper chaos seeks the harmony and stability of the aesthetic
pattern;” in this way we build understanding and values; “We rise to comprehension, to
understanding and wisdom, only by virtue of our capacity for the differential and
qualitative apprehension of formal values (Read, 1958, p.193). Discussing aesthetic
values Read states that they reflect the creative impulse, and that skills increase these
values. This development indicates maturation, but not aesthetic difference, because
there are different aesthetic standards relating to differences in temperamental
disposition that are reflected in divergent modes of expression. (Good examples of this
can be seen in the diversity of work in the data collection of photographs in the
empirical section of this dissertation, recorded on the enclosed CD).

In deference to theory upholding the biology of learning, Read supported
holistic, organic rather than logical patterns and advocates balancing “intellect and
feelings in some more inclusive method of education” (Read, 1958, p194). The
development of individuality in people who are at the same time developing awareness
of their place as social beings, plays an important part in Read’s theories (Read, 1958).
He advocates the experience of creativity in groups as a means of creating social
interaction and a common avenue of work and play.

Read (1958) thought it necessary to encourage people to return to the natural
way of being advocated by Burrow (1927) and take note of ‘the total organism’s
internal feeling behaviour’ (Read, 1958, p.197), again as suggested and developed by
later thinking and research. Based on the ideas of Burrow, Read (1958) proposed that
education should be conceived as functioning by developing interests in constructive
activities, and that this is an “essential basis of a healthy organic society” that would
help to prevent the separateness in society that is so destructive (Read, 1958, p197). In
this view, the responsibility of the teacher is one of encouraging the elements involved
in creativity, through their increased understanding of their students’ individual creative
processes. In this way empathetic and caring qualities are developed among
participants, each learning to better understand and therefore be able to offer support for
another (Belenky, Clinchy, Goldberger, and Tarule, 1986; Clinchy, 1989). This is
another positive survival process that is encouraged by means of art making. In discussing the empathetic relationship of teacher and students, Read suggests that the teacher should:

…preserve an organic continuity, so that the poetic vision of one age (of a person’s development) fades insensibly into the poetic vision of the next age: that the sense of value never loses its instinctive basis to become an ethical code, or an aesthetic canon, an artificial appendage to an otherwise purely appetitive existence (Read, 1958, p.212).

There is a natural ethic born of art making that is an integral part of the creative process and is reflected in the integrity of the resultant art work itself, in turn reflecting the integrity of the art maker (Dewey, 1934). The qualities and values of the artistic product are therefore evaluated according to the integrity of process and purpose, and this is recognised in relation to the experience of evaluating persons. If they are of similar or greater experience and sensitivity to that of the artist then they will comprehend the depth of value of the work. Those of lesser experience may appreciate a work, or not, accordingly. It may therefore be suggested that the most experienced artist works at his or her highest level of personal integrity and ethics. This is one of the strongest incentives for teaching art making process. Art teachers are not only teaching people to extend an enjoyable natural process of learning, but in so doing are encouraging the enjoyment and satisfaction of achievement that comes with attainment of the higher levels of personal integrity and ethical values (Abbs, 1994).

Henderson and Dees (1996) advocate teaching the ‘process of aesthetic knowing and representation’ as it is a fundamental form of human awareness. It is an experience that offers what these authors describe as “the joy of integrating head, heart and hand” (Henderson and Dees, 1996, p.118). In their book Teaching the Process of Aesthetic Knowing and Representation, Henderson and Dees (1996) turn to the work of Dewey (1934), Eisner (1994) and Abbs (1994) and their considerations on the integrated, holistic nature of the art making process. Learning about the creative process through the medium of art making is a holistic learning experience (Dewey, 1934, 1938; Kolb, 1984; Mumford, 1998; Perkins, 1981; Zeki, 2000).

According to Arnheim (1967), rationale for teaching the arts relates to the whole field of human endeavour, in that it is the most powerful means of strengthening the
perceptual component, without which productive thinking, the creative process, is impossible in any field.

New Directions for Curricula Considerations: Chaos Theory and Art Education

In considering the relationship of teacher with student, it is easy for a bureaucracy that makes decisions about curriculum, one that is concerned primarily with financial efficiency, to forget that this is a human situation where the teacher may influence the life of the student at a deep personal level. It is a great joy to an art teacher to encourage a student to an experience of art making that may affect their lives (Belenky et al., 1986; Eisner, 2001; Stout, 1999). Art making is an exciting area of critical thinking, of experiential and connected knowing, when teacher and student share a new understanding, an experience of discovery that may be the basis for future growth and development (Cheever, 2000; Clinchy, 1989; Elder, 1999; Emery, 1989; Galotti, 1998; Maturana and Varela, 1980; Perkins and Blythe, 1994; Stout, 1999).

The foregoing discussion in Parts A and B above stress an understanding of the art making process that centres on concepts that are related to Chaos Theory. They are identifiable in the developing dynamics of the process of art making. These concepts provide the structure for a holistic view of the artistic creative process that is one of an open ended, nonlinear, dynamic, complex system (Urban, 1995). This relates to the wider sphere where art may be viewed as inherently related to all life processes. In effect, the human system provides the basis for the creative process. It is “a living system as an expression of its structural connections” which determines its operations in a state of structural determinism (Warren, Franklin, and Streeter, 1998, p5). The process of developing creative thoughts when applied to teaching art must also bear some relationship to methods applicable to other subjects. The universality of the creative process provides a link (Gleick, 1987; Peak and Frame, 1994). Reflective practice is perhaps a more familiar, recognized form of creative process commonly accepted among areas of study and methods of teaching.

Therefore, in accordance with the close links between Chaos Theory and the creative process that are discussed in Part A, and supported by observations in Part B, it would seem that a learning process that attempts to teach artistic creative process would be facilitated in their organization by use of Chaos Theory concepts. It appears
particularly relevant in the area of self-organization that appears to link the two, through reflective process.

To reiterate, self-organization, or autopoiesis is a concept derived from Chaos Theory, referring to the self-maintenance of a form and its structural integrity, whereby the form of an element may be maintained while its components undergo change (Pribram, 1995). The concept of autopoiesis was developed from the observation of the structural integrity found in biological forms that maintain themselves even though their component parts may undergo constant change. This may be compared to the structure of a knowledge based on a subject that maintains its structural integrity while changing the content and form of internal components. In this way elements of a process are developed by the system itself, and are therefore totally interrelated and interacting, reliant on one another, as has been shown to be the case in the artistic creative process (see Part A above). This activity is the result of recursive action whereby the output of one action becomes the input of another. Such structural integrity is important in the development of an educational curriculum. Its form and structure provide a framework within which context specific work may be developed. Thus there may be operational closure, for example, a lesson may be completed, which leads to another operation within the unaltered structure of the over all curriculum. In following the pattern of a sequential curriculum, the curriculum and instruction interact in a systematic way. One stage of learning successfully negotiated leads to the next part of the curriculum, the learning building upon already acquired knowledge (Brewer, 1995).

Structural integrity is important in the development of a curriculum. An efficient process is based on its structure and there is a structural efficiency in self-sustaining cycles that reproduce, forming networks in a self-sustaining cycle (one artwork leads to another) through interaction with others. Form and structure provide a framework within which context specific work may be developed. An open-ended curriculum, with a strong sense of order may be constructed, that allows a teacher to suit the work to the students' capabilities and interests, whilst meeting the requirements of the curriculum subject specifications (Torrance and Myers, 1972).

Chaos and Change in Education

Hocking (1990) views schools as the centres for change, in calling for collaboration at all levels. In considering new paradigms for educational research and
change Hocking (1990) discusses the use of concepts from Chaos Theory that “offer new ways of thinking about the relationship between knowledge and change” (Hocking, 1990, p.17). Similar connections are made by Carr (1999) who, taking her lead from Doll (1993, 1989a, 1989b) considers the concept of self-organization to be a vehicle and framework for Dewey's ideas on education. The concept is based on a teacher’s role as one which does not impose order in learning, but acts as a generative catalyst in leading and encouraging the learning process (Doll, 1996). Hocking (1990) affirms that change comes from the classroom teachers who follow-through recommendations offered by research, and that small-scale actions may lead to large-scale change, resulting in the accessibility of broader visions for change on a practical level.

A connection between Chaos Theory and commentary on teaching the creative process may be made through Torrance (1971), Torrance and Myers (1972), Torrance and Safter (1990), who advocate a method of teaching which is open ended and incomplete, with the changing nature of things emphasized, in order to motivate achievement in creative learning. Torrance (1971; Torrance and Myers, 1972) quotes Froebel's advice to teachers to follow the lead given by young children, and encourage self-culture and self-instruction, clearly advocating the development of individual self-organizational abilities.

In a system that is self-organized sub-systems interact with one another to form a larger working system within the constraints of the sub-systems, so the whole moves and grows together (Thelen and Smith, 1994). The learning process and the creative process both work in this way. Their constraints are the different rates at which the parts develop, and the understanding that any input, however small, will greatly affect the outcome; therefore prediction of outcomes is unlikely. “Nonlinear processes build on themselves causing change from within,” hence the variability of change in a self-organizing system (Goerner, 1995, p.8).

Similarly, within the creative process the structure is also subject to change, indicating the need for an art teaching system that consists of an open-ended curriculum. The open-ended view of a curriculum allows growth, both by the teacher and the students in unexpected and unrestricted ways. Letseka (1995) suggests that an open system should prevail in education generally, with a two-way flow of information, of open discussion rather than instruction in a learning process.
The aim of an art curriculum, based on theories examined in the present work, is to enable students to reach an individual state of autopoiesis in their work, so that they have a personally structured framework within which to continue to individually explore their visual world throughout their lifetime. This framework is supplied by a knowledge base concerning a variety of materials and subject matter acquired from the experience supplied by the curriculum (Goerner, 1995).

To accommodate this kind of structure, an open-ended curriculum with a strong sense of order may be constructed, which allows a teacher to suit the work to the students' capabilities and interests, whilst meeting the requirements of the curriculum subject specifications (Torrance and Myers, 1972). Such a curriculum would take account of the fact that the teacher is also learning and subject to changing ideas. The open-ended view of a curriculum allows growth, both by the teacher and the students in unexpected and unrestricted ways.

The complex process of teaching creative process is therefore envisioned as a holistic activity, taking place within a self-organized structure containing interrelated elements. It would take into consideration the knowledge bases and personalities of individuals concerned, and the complex relationships of both teachers and students. Other parts of this whole are the social setting, the curriculum, the stage of development, the subject content. The extent and quality of growth and change through learning creative process must depend greatly on balancing these component parts. Change only occurs according to a person's readiness for development. In effect, the creative process of teaching itself adds to the holistic picture, the teacher his or her self continuing to learn through teaching practice.

The learning process is like the creative process in that constraints on growth are the different rates at which individual elements develop. This explains the variability of change between individuals. These needs are met by an open curriculum that allows individual circumstances to order the rate of development. Thus all the skills that are involved, technical, conceptual, meaning making, may develop at a natural rate of understanding. In considering that the human learning process is nonlinear Warren, Franklin, and Streeter (1998) stress the importance of learning basics of knowledge and relating new knowledge to that already collected. They state that we learn more easily as the process speeds up, which is verified by the pattern of order anticipated by means of such interconnectedness.
Arnheim (1996) points out that in painting a picture of the whole must necessarily include the parts. A picture of the whole in teaching the creative process through art is one that is composed of parts consisting of the elements of a curriculum. One individual element of a curriculum may be, for example, a lesson. Within that lesson are component parts, which add together to make a whole. Each of those component parts break down into smaller parts, until, like the fractal measurement of a coastline, they become infinitely measurable. If a practical art lesson is held, its main component parts may consist of an introduction to the subject for study, an explanation of the techniques to be used, discussion on possible interpretations to be explored, and individual input. To break it down further, the introduction may consist of verbal explanation, visual examples to discuss, questions and answers on the topic. Each of those sections breaks down again into more parts. For example, the possible verbal explanation could be variable in content according to time available; the student response offers infinite variability. The process needs limitations of time and organization to keep it in check. In Chaos Theory terms it requires an attractor to keep it focused and structured. This attractor metaphor is evidenced in the teacher focus, and the time, curriculum, and social setting constraints. The practice of teaching is a complex process, and its organization an incredibly complex system. The energy created by the action of these interrelationships that make up this whole process amasses, causing change to occur, and learning to take place. As in the creative process, a mass of new knowledge makes a student totter on the edge of chaos, to then reach growth of understanding, and move on (Gleick, 1987). A person adapts new knowledge from his or her environment to match the needs of his or her personal meanings. Sensitivity to initial conditions and path dependence are terms that describe how someone reacts to new information. Path dependence refers to the way that a path is followed from the initial response. Also important to note is that it is a unique path and it is irreversible (Goerner, 1995).

In this way, Goerner (1995) offers ideas that link the creative process, Chaos Theory, and art teaching. A curriculum that relates to all three areas would exhibit interdependence at all levels. The structuring of that interdependence, as discussed above, is vital, and it would appear to describe the possible interrelationships involved in learning. These interrelationships relate to concepts of feedback, circular causality, recursion, and self-reflexivity. Interdependence may be experienced in all these ways.
through art making, extended by group activities, and sharing others’ experiences. A recursive feedback loop is established when a person adapts to their environment. In so doing they change the environment, which in turn influences them. Such deterministic chaotic behavior arises within feedback systems, never precisely repeating themselves but staying within limitations of the structure within which they exist.

Another important consideration is that of iteration, which is a feedback function that often allows change to happen with speed (Warren et al., 1998). This function, when seen in the context of teaching emphasizes the importance of initiating feedback from students, in order to ensure learning has taken place. The patterns of such learning would exhibit a coherence that reflects a self-organizational process. It relates the three processes involved in learning, art making, and creativity.

Patterns may be used in prediction, explanation, and evaluation or judgment of work. The ability to do this results from recognition of the development of a pattern within an artwork as evidence of its pattern of process; for example, a stable pattern shown with an attractor exhibits a holistic order in chaos (Arnheim, 1996). This relates to teaching in that it would appear important to offer a basic learning structure, a pattern of learning in a curriculum. This would form an autopoietic, open system, developed so that sequential growth eventuated. In a self-organizing structure the curriculum and instruction would interact. Old patterns would be allowed to dissolve and new patterns emerge (Letseka, 1995). The energy flow created by an educational structure that is self-organizational makes the system more efficient. “Massive pressure creates a cycle of evolution” (Goerner, 1995, p.12). Each stage is the foundation for the next, a cycle like that of a sequential curriculum (Brewer, 1995). This leads to self-sustaining cycles, which reproduce themselves, thus creating widespread networks of growing interrelated knowledge. Similarly, in the interwoven wholeness of the ecosystem, evolution is seen as being reliant on co-operation, co-ordination, interconnectedness, “Everything affects everything, eventually” (Goerner, 1995, p.14).

This interaction is reliant on co-ordination, and interconnectedness, both within the activities of one individual, and between participants, as in a group-learning situation. There are networks of activities that interact, in the creation of a related order of connectedness of teacher, student, and process.

In order to achieve a method of teaching whereby students learn in a relational way, a sequential curriculum would appear to provide a suitable initial framework.
“Students are provided with opportunities to seek understanding and to observe and experience relational or situational connections in their art and in their lives” (Brewer, 1995, p.72). Brewer (1995) describes an interrelated system of sequential learning that seems appropriate, particularly when change takes place in education systems that often affect teaching. If students have a sound grounding in a process of learning they will be able to understand when the process changes, and work with it.

Teaching creative process is a holistic activity, which includes consideration of the knowledge base and personality of individuals concerned, both teachers and students. Other parts of this whole are the social setting, the curriculum, the stage of development, the subject content. The extent and quality of growth and change through learning creative process must depend greatly on balancing these component parts. Change, that is, learning, only occurs according to a person's readiness for development. In effect the creative process of teaching itself adds to the holistic picture, the teacher continuing to learn through teaching. Through the process of teaching art making we can "enhance our awareness of our interconnectedness and our creativity, which is generated out there between ourselves - yet is also so reflective of our unique selves-out in that interactive network" of life (Houghton, 1989, p.58).

So how do we help people to grow in knowledge, and do people reach saturation level - a stopping point for learning, for understanding new knowledge? Is it enough to introduce new challenges, fresh experiences, suggest links between experiences and comprehension of process, the facility to trust a feeling of openness to experience? Is it that “We need to nurture an uncritical risk-taking and mutually accepting openness toward our potential”? (Houghton, 1989, p.57).

SUMMARY CONCLUSION

When considering curriculum generally, Chaos Theory concepts provoke some quite fundamental reconsiderations, perhaps offering form and substance to Read’s ideas. Clearly, the matter of art education – why it is important, how to do it better, and its value to education more generally as in education ‘through’ art – has seen reflection, controversy, curricula development, review and change over a very long period of time. What emerges in considering this history is a constant call to focus on art making. Art making goes to the dual thrust of each aspect of the differentiation between art education and education through art. In turn, this call is supportive of the emphasis on
art making that enervates the present work. That said, the theoretical and observational dimensions of this work elaborate the process of that art making, and in a fashion that keeps faith with the best accounts, or at least the best heuristic, of that process. That is, just as Chaos Theory attempts to best capture generally the reality of human knowing, choosing, and meaning-making - just as it might best capture the manner in which the cosmos operates – so it provides a valuable way of understanding the art making process, and its key notions can be found in the actual art making process as it is ongoing.

In turn, given that Chaos Theory ‘works’, then there are implications for art teaching. These implications go beyond the value of art making (and even appreciation, and analysis etc.) as a vehicle for more general education because of its natural ‘holism’, and go also to how art teachers might best understand what is happening to their pupils. Here also, might ‘blocks’ and ‘resistances’ be identified, and dimensions of the self and its development be illuminated. These are very ambitious expectations, but they are supported by the deep and thoroughgoing nature of art, which has constantly challenged mankind’s understanding. They are supported also by the review and discussion of theoretical effort and the observational study presented in the foregoing Chapters, and more particularly in the complexity of the matter revealed in that discussion and observation. In turn, observations to date invite specific comment on curricula considerations.
CHAPTER EIGHT
NEW DIRECTIONS FOR REFLECTIVE ART TEACHING PRACTICE

In considering the reflective aspects of the artistic creative process, this study acknowledges the importance of the parts played by processes that deal with information and knowledge acquisition in human experience, thus emphasising the important part played by reflection in human learning and teaching. It therefore follows that this acknowledgement of the part played by reflection in teaching serves to support previous work in this area of educational theory.

Towards a Reflective Art Curriculum

The era of the ‘Reflective Practitioner’ is well established in the education arena, recognised as the way in which teachers naturally work in the field, and it would therefore appear to be a natural link to bring together the reflective art maker and the reflective teacher in a consideration of the reflective art teacher (Lovat and Smith, 1995).

The reflective process when applied to the teaching curriculum is one involving open systemic thought that follows a heritage going back to Plato and Aristotle, carried on by Dewey and Whitehead, and more recently by Derrida and Foucault (Doll, 1993; Lovat, 1988; Lovat and Smith, 1995; Maitland and Cowdroy, 2001; Schon, 1983, 1987; Van Manen, 1977, 1990). Lovat and Smith (1995) also refer to Habermas (1972) in this context, and his “notion of self-reflection” that “offers the best chance we have of merging theory and practice in curriculum” (Lovat and Smith, 1995, p.32). Habermas (1972) provides a balanced view of the technical with the reflective in suggesting a critical theory for curriculum that includes three ways of knowing. These three ‘cognitive interests’ comprise technical control, empirical/analytical, and historical/hermeneutic (Lovat and Smith, 1995). These are combined in an interest in being free, which relates to a self-reflective form of knowing, which allows the freedom to facilitate action, which causes change. Together these areas blend to provide a balanced interconnected whole (Lovat and Smith, 1995).
Teaching according to this philosophical approach encourages students to develop skills of independent learning. The teacher is seen to be the designer of a developing course of action, which the students follow. The curriculum theory of the teacher that has developed from reflection on their experience is the guide used to take the student from a technical, analytical introduction of a topic, through a stage of understanding the meaning connected to the topic, towards an individual comprehension related to the topic, all resulting from self-reflection. This method of working results in the development of self-confidence in the freedom to explore independently, creating a self-learning situation. Critical reflection in a teaching situation may be understood to lead to intuitive knowledge derived from action, from experience, which, when applied by the teacher, becomes intuitive action.

Schon (1983) is a great influence in the area of reflective practice, pointing to the importance of the interaction of teacher and student, precipitated by processes of reflection-in-action, and reflection-on-action. Reflection-in-action refers to the process whereby the teacher reacts according to the prevailing moods and other influences of the current situation, often initiating changes to the learning process on the spot if necessary during a lesson. Teachers are constantly reassessing and modifying their situation, selecting and focusing on emerging issues, within their boundaries of “operational space” (Lovat and Smith, 1995, p.133). Reflection-on-action refers to discussion of the results of the learning experience, thereby teaching a learning process that is self-perpetuating, self-organizing, a process for lifetime learning. There is interaction between curriculum and instruction in the holism of self-organization (Houghton, 1989).

Lovat and Smith (1995) present a concise and clear explanation of the background to reflective practice that explains this process of teaching, proposing that teachers prepare curricula in a self-reflective way that offers a problem-solving approach. An example of this approach is found in the recent experience of the Architecture Department of Newcastle University NSW. Maitland and Cowdroy (2001) describe their establishment of a successful problem-based learning system that developed from the concepts of reflective practice already used by the Medical Faculty at Newcastle University NSW, and those gleaned from the theory of Schon (1985). They worked to develop a situation where students could study architecture by means of problem solving. This experience of creating a successful working educational model,
to provide a student centred learning process, involved some trial and error, a reflective process of creation in itself. Solutions to problems of integration were found and the whole has evolved into a system that encourages highly motivated and interactive staff and student, as well as student-to-student relationships. “It encouraged a symbiotic enthusiasm and confidence between students and staff” (Maitland and Cowdroy, 2001, p.97). The group situation is important for support. Within their problem solving process students are encouraged to “work as a group, think individually.” The necessary evaluation process focuses on the integration, the presentation and defence of ideas by individuals, in order to access the reasoning used by the students.

This process of curriculum creation even entailed building a new facility, where students from all years interrelate successfully, working in individual student spaces in adjacent year studios that are created in large open areas. Maitland and Cowdroy comment, “In reflecting on this success, we are reminded that education ultimately occurs in the mind of the student, and that the physical environment and setting play an important part, beyond the philosophical issues with which we had been so preoccupied” (Maitland and Cowdroy, 2001, p.97).

This is a truly holistic solution to a problem educational situation that has proved itself by its success. It also lays emphasis on the importance of physical and mental comfort in a creative situation, of social input, of individuality encouraged in a creative atmosphere. It is a practical example of Read's (1958) recommendation to integrate the individual into society by working in groups that provide sharing and support, social interaction in creativity, a natural human interactive process whose encouragement was advocated by Burrow in 1927 (Amabile, 1983; Burrow, 1927). The connection between a curriculum plan and its activation in a classroom bears reference to the personal contexts of teachers and pupils and the environment in which the learning takes place (Lovat and Smith, 1995).

Lovat and Smith (1995) comment on their vision of future developments in education, “Rather than interests of technical control, schools of the future would be focused on the interests of interpretive understanding through collaborative reflection on experience-based learning” (Lovat and Smith, 1995, p.241). Art education is particularly suited to this process of learning, and Maitland and Cowdroy (2001) would appear to be teaching in this way successfully now.
The experiential aspects of art making have been discussed above in Part A and Part B, as an integral part of the artistic creative process. (Specific references to experience may be found above; however, experience is a keyword of the present word) Experience gained through sense impressions combine with experience of interpretation in providing both intellectual and practical knowledge (Dewey, 1971; Eisner, 1985). Therefore ‘experience-based learning’ is a natural extension of the art making process (Lovat and Smith, 1995).

‘Change’ is a constantly recurring keyword in discussing teaching artistic creative process. It is the natural process of change that involves learning and progressing through life. Lovat and Smith, (1995) regard the necessary curriculum to be:

one concerned not just with the ‘facts’ of information, nor only with the meanings behind these facts, but with instilling critical reflection leading to praxis, that practical action on reflection which is oriented to change, change for the betterment of self, others and the world. This is truly a critical curriculum . (Lovat and Smith, 1995, p.248).

This activity describes the artistic creative process, its facility for practical reflection and betterment of self through a constantly readjusted process of change. It is also explained by the concepts relating to change that are found in Chaos Theory. The concepts of reflection-in-action and reflection-on-action represent the creative process of art making.

The theoretical research discussed in Part A and the empirical research discussed in Part B would indicate that there are certain aspects of art making that may support consideration of the importance of encouraging teaching through art making. The reflective process appears to play a vital role in the development of not only ideas, but of the person as a whole.

From the point of view of art education, the diagrams that resulted from the empirical research synthesis of data provide information about the artistic creative process that relates all the component parts and that may therefore be taken into account in the creation of an art curriculum relating to any art learning situation.

Any of these areas could be explored in-depth but the initial questions chosen from the theory section, Part A would lead one to consider them in relation to one
another as parts of a whole active system. However, consideration of the reflective network of activities appears to encapsulate the whole process.

The reflective activity of the artistic creative process is a deeply personal experience that appears to be activated to verify/validate/affirm individual identity (Maslow, 1968). It appears to be a natural process in which artists profess trust in providing them with an experience of their own particular truth of the moment. Artists’ belief in this process leads them to consider it an escape from the stresses of everyday living in some cases, one that allows them respite to revisit, re-establish a personal natural balance or homeostasis within their worlds. Simply, they feel better after making art, and may even feel better able to identify and address problems in their lives. (Refer to Data from Empirical Study, and the Report relating to the study, particularly BRob).

If art making is understood to encourage an individual facility to be able to constantly balance life, then this is a valuable asset/skill to teach people. The ability to reflect, to relax into making and allow the mind to seek a natural balance is a skill that is incorporated in learning to make meaningful art objects.

The reflective part of artistic creative process is not an isolated element, a separate stage of a process, but interrelates with all other aspects of the process – as shown through the making of a whole piece. The ‘stages’ of process interact in such a way that they may not be separated from one another. Reflection occurs continuously during the making process, it is always there. It is the process of interaction.

Growth within the creative process seems to vary in its rate and type from one piece of work to another. Whilst working with researcher’s own students they sometimes seem limited by their conceptual capabilities, seem to be struggling, and then we have a breakthrough, either individually, or as a group. It seems that these sudden steps forward are linked to development of one area of concentration or another but not always the same one. SZ comments on his practice of learning a new skill as he becomes aware or feels the necessity to do so. Does this mean that all these artistic capabilities can be extended by and through extending strengths in other linked areas of knowledge, such as perhaps technical ones? Does this extension open the door for other so far limited areas to expand to the stage of the one extended to a further reach? Is it in fact one and the same process linked neurophysiologically, through neural networks? So that conceptions of growth in technical skills and techniques could mimic the same process found in developing conceptual skills in other areas, in which case an over all
growth of understanding may take place, enabling “encouragement of personal growth (as) a real possibility” (Maslow, 1968, p.6).

People are unlikely to overstep their own boundaries if the growth is holistic, and recognised as a process (Polanyi, 1962). If they are familiar with, in touch with their own growth process, then it is possible for them to understand where they are going, or at least see a path to follow. Understanding individual patterns of growth is an essential reason for individuals to learn more about their creative processes. Because this is what we do all the time as part of everyday living, therefore to extend knowledge and understanding in this area is a natural process.

Therefore it is suggested that a curriculum for teaching artistic creative process would be self-organizing, sequential, incorporating iteration and recursion, one that functions by means of reflectivity. It would aim to develop individual creative abilities based on an openness to experience, and a sharing intention, that would emphasis connectivity, interactivity, and interdependence among all participants, whether they may be teacher and student, or members of a peer group.

**Practical Considerations – What to Teach and How**

Arnheim (1996) points out that in painting a picture of the whole must necessarily include the parts. A picture of the whole in teaching the creative process through art is composed of parts consisting of the elements of a curriculum. One individual element of a curriculum may be, for example, a lesson. Within that lesson are component parts which add together to make its' whole. Each of those component parts break down into smaller parts, until, like the fractal measurement of a coastline, they become infinitely measurable. If a practical art lesson is held, its main component parts may consist of an introduction to the subject for study, an explanation of the techniques to be used, discussion on possible interpretations to be explored, and individual input. To break it down further, the introduction may consist of verbal explanation, visual examples to discuss, questions and answers on the topic. Each of those sections breaks down again into more parts. For example, the possible verbal explanation could be variable in content according to time available. The process needs limitations of time and organization to keep it in check. In chaos theory terms it requires an attractor to keep it focused and structured. This attractor metaphor is found in the elements of time, curriculum, social setting constraints, and a teacher focus. The
practice of teaching is a complex process, and its organization an incredibly complex system. The interrelationships which make up this whole process amass to cause change to occur, and learning to take place. As in the creative process itself, a mass of new knowledge makes a student totter on the edge of chaos, to then reach a state of growth of understanding, and move on (Gleick, 1987).

The physical context for learning, the organization of the setting, the building, arrangement of workspaces, is a great influence on the process of learning (Maitland and Cowdroy, 2001). The social relevance of creating a physical working environment as Maitland and Cowdroy have done at Newcastle is a vital contextual adjunct to the needs of the individual learner, in encouraging the creation of a mental working environment (Amabile, 1983). In addition, as noted by both the theoretical and the empirical studies above in connection with artistic creative process, components such as mood, and individual ontogenies affect the learning process.

In order to teach the creative process and teach through the creative process it is necessary to build an individual’s understanding of the process and help them to develop interpretation for their experiences. So how do you help people to grow in knowledge? Is it enough to introduce new challenges, fresh experiences, suggest links between experiences and comprehension of process, the facility to trust openness to experience?

Read (1958) points to three, often conflicting, activities that form the pedagogy of art teaching. They are
- Self-expression, the communication of an individual’s thoughts, emotions and feelings.
- Recording of observations to clarify conceptual knowledge.
- Activity of appreciation of others’ modes of expression and responses to values.

To Read (1958) it was clear that these three activities are three distinct subject areas that may demand separate and perhaps unrelated methods of approach.

Herbart wrote ‘The Science of Education,’ published in 1806 in Germany (Robinson, 1977). Herbartian theory dealt with ‘apperception,’ which term he used to describe “what he considered the fundamental process of acquiring knowledge wherein the perceived qualities of a new object, event or idea are assimilated with and related to already existing knowledge” (Reber, 1985, p.49). Educationally he emphasized the
need for a teacher to present new work so that it related to, or linked to that which the learner already knew. A clear approach to teaching a lesson was suggested.

Preparation - state the aim of the lesson clearly.
Presentation - gain new information from reading, practical experience
Association - interpretation, comparison, abstraction - connecting new information with old
Generalization - formulation of general principle from last stage of association
Application - evaluating other situations or experiences in terms of the generalizations

This summary of teaching a lesson provides a basic plan that is applicable in any learning circumstance. It sets a pattern for the practical experience of an interactive curriculum, and one that is critically reflective. It would accommodate those elements suggested by Read (1958) in an everyday pattern of learning activity.

If we are to take a lead from discussion on reflection, both in creative process and in education, a curriculum for the visual arts based on critical reflection may include also Habermas’s three ways of knowing as the content for such lessons (Lovat and Smith, 1995). “A more effective practice” will result from a critically reflective approach to teaching; it is “more educationally desirable and justifiable in humane and ethical terms” (Lovat and Smith, 1995, p.160). Lovat and Smith (1995) suggest that teachers prepare curricula in a self-reflective way that “represents a problem solving approach” (Lovat and Smith, 1995, p.132).

It is therefore suggested that a problem centred curriculum is the most appropriate vehicle for teaching artistic creative process. It anticipates interaction and connection of students and teacher in a process of learning that is open and reflective in character (Maitland and Cowdroy, 2001). Suggesting problems to overcome involves discussion between members of a group followed by individual, or group work that will explore possible solutions in a reflective manner that allows change and emergent experiences to occur. These experiences are shared but also serve to validate individuality and identity of the individuals concerned. This self-organizing process would happen within the structure of contextual limitations provided by educational environment, and individual contexts as discussed elsewhere. Richards (1996) believes that we can “enhance our awareness of our interconnectedness and our creativity, which
is generated out there between ourselves - yet is also so reflective of our unique selves-out in that interactive network” of life (Richards, 1996, p.58).

However, if we take guidance from the foregoing empirical study in relation to these aspects of art making it may be possible to envisage them as integrated parts of a whole self-organizing activity. Most of the artists in the study made recordings of initial observations in order to clarify conceptual knowledge of their subject-matter / content. An expressive statement relating to the subject matter / content followed these preliminaries. Appreciation of others’ modes of expression and responses to their values would appear to follow as a natural extension of their own work (see comments by BRob, EK, TS).

In order to both teach the creative process and teach through the creative process it is necessary to build an individual’s understanding of the process and help them to develop a system of representation which they may use to interpret their visual experiences. This may be achieved by means of informed teaching that is done with due consideration of the processes involved in art making. Medical research offers information relating to learning that must only enhance teacher understanding of creative processes. (Please refer to page 28 for relevant reference on this point.)

Evaluation on the part of teacher and peers is also a vital part of this process. Evaluation is at the heart of curriculum. Lovat and Smith (1995) consider this to involve a negotiation of meaning, particularly appropriate in the area of art making, which involves meaning making on an individual basis.

There is no one reality of a situation, as we have seen. There are many, one for every participant. If the evaluator’s role was to be an honest broker, then he/she needed to base the evaluation on the meanings and perceptions of the situation, negotiated with the various participants. This negotiation of meaning is not only of the information collected, but how that information is interpreted in the context and used in any written report (Lovat and Smith, 1995, p.241).

And:
Rather than interests of technical control, schools of the future would be focused on the interests of interpretive understanding through collaborative reflection on experience-based learning (Lovat and Smith, 1995, p241).
The reflective practice of art teaching in the visual arts is a demanding and personal experience for the teacher, often exhausting, but extremely rewarding (Crebert, 1992). Therefore experiences of art making in a learning situation would require that they offer opportunity for individuals to work alone, with close reference to a group for discussion and support. The work would evolve naturally over the time available and incorporate learning skills relating to technical means of interpretation, concept building, and meaning making. A balance of these skills would be sought in order to facilitate the learner’s holistic understanding of the interrelatedness of the artistic creative process. However it needs to be served up with a large helping of ‘enjoyment and delight’ in developing a ‘visual appetite’ that is exciting and enervating, encouraging an exhilarating involvement in a sense of wonderment in the world around us that engages the not only the “senses, hearts and minds,” but the very soul and spirit (Kindler, 2000, p.42).

As an example of the result of such a process, the appended reflective self-organizational curriculum is included for reference. This curriculum was developed over a period of fifteen years teaching in the community. It grew according to the particular individual needs of the students, and the constantly developing understanding of their needs by this teacher researcher. It is by no means offered as a finished product, but as an example of an open, ongoing project that is subject to constant change, affected by all the elements considered above, working within a self-organizational framework. It is offered as an example of a curriculum that is well suited to one particular teaching situation, but may certainly not be appropriate for another. Copy of this curriculum may be found in the appendix and on the accompanying CD.
CHAPTER NINE
A DISCURSIVE CONCLUSION

The title of this study implies a search for understanding relating to the reflective aspect of the artistic creative process, coupled with an inquiry into the relevance of Chaos Theory concepts in furthering this understanding. The relevance to art education of any findings from the theory or related empirical study was also to be explored.

A critique of this study would perhaps ask whether it might prove as useful or relevant to teaching artistic creative process as other studies in this area. Does it prove a need for change in art education? Does the material synthesised and the data gathered from close observation of the process of art making while it was occurring provide a sound basis for a flexible format that will continue to help in developing curricula that are inevitably in a state of constant change?

Parts A and B of this study suggest that teaching artistic creative process is not a question of developing or identifying creative talent, and concentrating on developing selected people to genius level, but of encouraging the creative urge in everyone. 'Geniuses' may develop seemingly rapid solutions to problems, or new inventions affecting humankind as a whole, but isn't the most important object of an 'education' process, to prepare people as individuals, to live their lives to the full, at whatever level. Is the child who experiences the greatest joy in the world from making a small pottery figurine and then giving it away to someone who would treasure it, not creating something important, both emotionally and spiritually enriching the world? He or she may at the same time have developed an understanding of the process of making which is not at genius level, but that experience may have helped him to grow as a whole person just a little. To be able to recognize in oneself the facility to become involved in individually developed creative process is a means of self-validation.

An analysis of art teaching process is offered by Abbs, who aims to develop art education by following Socratic principles in teaching and learning. He states a need to accept critical reflection and sustained enquiry into meaning in a lifelong process. The main spirit of his book is not to develop the critical intellect, but the “aesthetic intelligence” (Henderson and Dees, 1996).
Neither Socrates nor Kokoschka wrote anything down about their teaching, but taught according to the aesthetic needs which seemed appropriate to them at a particular day and time, living in a momentary, never to be repeated teaching context (Toub, 1994).

Socrates’ teaching was rooted in the uncertainties of life and existence and as such, all conclusions remained open, with no exact results to be expected (Abbs, 1994). Abbs proposes that his diagram of the phases of art making, (mentioned in Part A, page 14) with categories that include making, presenting, responding, evaluating that are shown relating to tradition, creation, individual and community, describing it as a “dynamic model for the teaching of the arts” (Abbs, 1994, p.96). But he later suggests that “it is only a rough schema, a working schema, but if in broad outline it corresponds to the nature of the creative process, it could have value in improving the quality of arts teaching. It could heighten the teacher’s awareness of how to pace and space, of when to intervene, and on what terms, and of what formal and informal conditions may be necessary to complete whatever expressive activity has been put in motion” (Abbs, 1994, p.112). However, relevant to this study is the list of major concepts connected with art teaching that are identified by Abbs. He considers that teaching is also achieved by balancing what he sees as “opposites of the mind and the ramblings of confused thoughts” with the logical organization of ideas, a suggestion implying a prescriptive rather than an open method of teaching (Abbs, 1994, p.45). Abbs’ philosophy of arts education covers ten propositions -

1 - To make use of the naturally acquired biological inclination to be actively aesthetic, that is, to be involved in those things perceptible to the senses, and to use the word aesthetic according to its fundamental meaning.

2 - The arts work in and through the aesthetic and forms of the aesthetic response. The arts are intrinsically cognitive educationally, with ethical references.

3 - The six great arts are a generic community - visual arts, drama, dance, music, film and literature.

4 - Each arts discipline has its own set of practices.

5 - The link between students’ aesthetic energies and their cultural background should be encouraged.

6 - Exploration should be made into previous symbolic practices and culture.
7 - there should be encouraged an ability to reflect absorbed knowledge from diverse viewpoints.
8 - A knowledge of art making processes should be taught.
9 - The aim should be to foster the kind of knowing that focuses the aesthetic intelligence, keeping faith with the sensuous appreciation and comprehension of meaning which is the absolute foundation of aesthetic education.
10 - To use new artistic interpretations of reality to develop perceptions reaching out to the spiritual aspects of human life.

Abbs’ propositions are made with the whole of the arts arena in mind, and as such, it is a complex plan for arts education maintaining an approach that is different from this study. It differs in that the aim of this study has been to concentrate on finding out how the artistic creative process works, particularly in relation to the visual arts, in order to identify essential elements of that process and find a language with associated definitions that most simply describes such a complex process. In so doing this study incorporates many of Abbs’ recommendations, but is interested more in describing and linking concepts to their practical manifestations in interpretation.

From a classroom-teaching point of view, some of the information offered by this study may be considered impractical. For example, the idea of a teacher trying to relate individually to each member of a class of 30 or 40 children is an impossible task, especially if they only meet once a week. The logistics of so many working on separate projects at the same time introduces a need for limitations that one would anticipate in such a situation. But all creative situations have their own limitations or boundaries, or structure. The structure of lessons in this case is bound by the numbers of pupils, amongst other things. The practical problems and possibilities represent only part of the many challenges to the teacher’s initiative and creativity.

The theoretical research discussed in Part A and the empirical research discussed in Part B indicate that the reflective process appears to play a vital role in the development, not only of ideas, but of the person as a whole. The development of a creative process is also shown to rely equally on the interaction of all aspects of the process, that the reflective elements are nothing without initial immersion in subject-matter and skills, and then followed by interpretation. In practice the elements of the
process are found to be so interdependent that the artistic creative process is one of interactivity that involves the biologically synchronized actions of mind and body.

Such interaction is described by this study as a self-organizing process, where the activity of one part influences the activities of all the rest. It is an open-ended process with no set outcomes, no opportunity for prediction or anticipation of results. However the boundaries within which an artist works provide a self-organizing structure that ensures that these contextual restrictions form a sound basis for growth and development. An open self-organizing structure is one that allows restructuring of the boundaries in an extension of the activity of art making. There is an ordered sense of openness in the ability to move beyond boundaries that relate to those previously held. It is a sequentially evolving structure providing a framework for growth of understanding that is totally related to all that has gone before, intimately related to the ontogeny of the individual. Therefore an art teaching curriculum built around the principles of self-organization would provide a means of learning about the artistic creative process through the experience of art making that is related to the development of the individual. The organizational boundaries within which the teacher and students work provide a framework that binds them in a social structure that is also of a self-organizational nature, in that it is also subject to evolving change. The experience of working within this social structure integrates the individual art maker into an arena of sharing and social interaction and connectionism.

These comments refer in general to the results of parts A and B of the study, and they summarise the findings which are detailed elsewhere, (see Part B). The elements that appear in relation to one another in the findings appear to be the essential components of the artistic creative process, based on this study. These emergent areas of synthesis are offered as guidelines for consideration by those who are involved in creating an art teaching curriculum, syllabus or lesson plan.

This study is one that moves around the attractors of interrelatedness, interaction, connection, emergence, rather than those of reduction or rationalisation with the separateness in society that these last encourage. It therefore supports the view that the challenge of the future is to work towards connectionism and away from reductionist practices (Lovat and Smith, 1995). “The challenge is to reverse the disconnectedness of the present world and to develop a curriculum that is not based on
separateness of knowledge from life and being, but upon their inherent unity and integration” (Lovat and Smith, 1995, p.248). Art making has a strong role to play in this arena where cognition and emotion are understood to be acting in tandem in an interdependent and interactive mode. In art making the natural human search for constants and homeostasis may be acknowledged in challenging work that encourages enjoyment in making resulting in personal affirmation of identity.

Lovat and Smith (1995) envisage that subject fields would not be the focus “but rather (teachers would be) facilitators of learning programs built around experiences, together with those working at the cutting-edge of knowledge fields”, for example scientists and artists (Lovat and Smith, 1995, p.241).

This is why it is so important to understand how the creative process works at the level of actual art making, thus enabling better teaching approaches that encourage its development. To understand how the brain functions as a network, akin to any other integrated system of component parts, is to appreciate that there will be strengths and weaknesses to be nourished within each of the different areas/components/elements of the artistic creative process. Such an awareness means that the balance may be constantly addressed, so developing and encouraging the self-organizing process within individuals, an encouragement to recognize order within disorder as integral to the creative process, particularly at the stage of incubation / reflection. There is a sense of freedom felt when we are able to explore within securely ordered walls offered by the flexible structure of an ever changing network. It is a situation that fosters creativity, resulting in evolution of ideas and people, offering the society concerned an opportunity to achieve “organic wholeness” (Read, 1958, p.5). The interconnectivity of a society and its environment may receive strong support by people simply working together in a naturally interdependent creative way (Richards, 1996).

In order to develop the creative process within the community through art education it is possible to work towards individual self-organization, which is self-maintenance, self-education, by creating a nurturing context in the connectedness of teacher, student, and process. Important elements in this are social relevance, the physical and mental working environment, and the development of a structured framework for the interaction of the whole. Too many people feel themselves unable to perform as artists or creative individuals, believing the myth that it is necessary to own a special talent in this area, that a high level of exhibited expertise is demanded.
However, if given a chance to learn a few basic skills, experience has shown them able to surprise themselves with their own creative abilities. The researcher's experience as a teacher has shown that it is possible to enable individuals to enjoy a developing understanding of their own creative potential. It is possible to teach them to learn to appreciate that they are, or are not, growing in understanding. It is possible to teach people to learn to ask questions which help to rectify a problem situation, setting in motion a further stage of development in their sequential growth, a situation where considerations of ability have no relevance whatsoever.

It would appear that the aim of an art curriculum is to enable students to reach a state of self-organization in their work, so that they have a personally structured framework within which to continue to individually explore their visual world throughout a lifetime. This framework is supplied by a knowledge base concerning skills in using a variety of materials, methods and subject matter, primarily acquired from the experience supplied by the curriculum, but bearing in mind all the individual ontological experience that accumulates in a person's life. Learning the artistic creative process is a student-centred learning process simply because it involves development of the individual. From the security of this individual position they are able to relate to others and their total environment.

Therefore the reflective process that is involved in artistic creative process may be considered to be of vital importance when considering an art curriculum, and the dynamics of the activity involved may be described adequately by means of Chaos Theory concepts and language.

However, this evaluation cannot be made without recognizing that all of the above is probably what good teachers everywhere are doing naturally anyway. And that perhaps spurred on, indeed encouraged by, those restrictions of society that they may decry, by the need to extend themselves, are able to develop in our young the creativity of mind and strength of purpose that develops its own evolutionary survival capabilities. This study is limited by restrictions of the requirements of this particular degree, however there are many possible directions to follow from the ideas developed here. For example,
A continuation of the study of concepts that have here been considered may lead to further refinement of understanding relating to the interactions, interconnections of the art making process and art teaching.

An empirical extension of the study would be to go out into the field and explore what art teachers are doing in the classroom and studio. This could be related to what the artist is doing in the studio, perhaps revealing interesting anomalies.

Longitudinal studies of artists at work would be more revealing than that enclosed in this study, perhaps leading to a better explanation of process.

Ideas about process from this study could be followed through in an art teaching curriculum to trial the suggestions they make.

A consideration that is not followed up in this study due to time constrictions is that of measurement systems relating to the change process. Measurement systems have been created to work out where people are in stages of the change process, particularly for use in social work, and perhaps suitable for like the development of learning in the field of education (Bolland and Atherton, 1999; Guastello, 1995; Hudson, 2000).
AFTERWORD

A Personal Note

According to the philosopher Ly Tin Wheedle, chaos is found in greatest abundance wherever order is being sought. It always defeats order, because it is better organized.

(Pratchett, 1994, p.12)

And central peace existing at the heart of endless agitation...

Wordsworth (1770-1850)

A comment on the origins of this study may well refer to the work of Schwenk (1965) and Thompson (1961) mentioned above in connection with the development of Chaos Theory. Both of these books came to the attention of this researcher whilst an art student in the 1960s, and had a profound effect on a lifetime of art making and teaching art, of which the present study is something of a culmination. One might say I have come full circle, or simply taken part in a natural iterative process of growth and change. Learning to comprehend the interrelatedness of all things has been an abiding interest.

The more I read the material that I have gathered on this topic the more interrelated it becomes, because connections continue to emerge between parts that cannot be truly separated from one another; neither connections nor parts. This overwhelming sense of interconnectedness is such that it seems to require other forms of interpretation than words allow.

Hence the inclusion of ‘Researcher Interpretations’ on the accompanying CD that incorporate some of the poems, drawings, and collages that were made by the researcher during the time of creation of this thesis, a period of three years. In themselves they are evidence of emergent themes of the study, since they reflect growing synthesis of thought and understanding on the part of this researcher.

The poems speak both to reflection on the readings that contribute to this work, and to direct experience in expression of an absence of temporal awareness, of existing at one with the moment.

The first drawings in the collection are the result of shared experience, of life drawing sessions with a group of artists, of expression of visual analysis and resulting emergent understanding; exploration of a disciplined use of materials and vision in
commentary through a growing interpretive vocabulary. Light and dark create shape and form that may merge through vision as if flowing. Flowing thought links visual foci as I struggle to see what is really there – that vision which is created by my whole self at that moment alone that is ever changing. Each mark summarises a small aspect of an ever-changing view; added together they create a reflection of a certain combined depth of visual understanding. The vision of light and colour on a figure is ephemeral, caught for an instant by an ever-changing memory of focused images. Thus, what appears blue at one moment may acquire a red tinge on deeper looking, and a touch of yellowish-orange, with the green that is emerging with a change in the light, and so the interpretation builds – layer by layer of looking – intensely visually selective – guided by the mood of the day.

The collages are a means of looking with the heart, through the use of predominantly natural found materials that resonate relationships with one another. Their colours, shapes and forms interact to reflect joy in their joint beauty. Interactions and interconnections are enhanced by the addition of different media that consolidate the balanced wholeness that is emergent during making. The fact that there is a balanced wholeness in each completed work, but no apparent end to possibilities to be offered by new works, is a rewarding discovery, relating a reflection of the understanding of self achieved by making this whole thesis document.

More recently – January 15th, 2002 – going into the bush to draw for the first time for a long while, I found that, as expected, it took some time to become involved in a drawing, even though having surprisingly quickly found an area of interest to study, being drawn to a grouping of trees that exhibited clear images of attractive, colourful trees with definite forms vying for attention, set between larger, framing, different types of trees – a cathedral-like assembly. As I drew it became more difficult – shapes, lines and colours appeared to merge visually as I looked for clear definition. A decision followed to destroy the initial lines by merging forms and then allowing solid and ephemeral shapes to move forward to the surface together, seeking to achieve a balance of interconnectivity, a drawing that could show several levels of visual information at the same time, but without a sense of ambiguity, as true as possible to the envisaged image.

A second study took me to a tangled pattern of intertwined and twisted branches, again difficult to analyse, hard to differentiate one shape from one another and from the
background of masses of distant trees. This was solved by use of a predominantly linear drawing of solid lines vying for attention, a very active, different study from the first.

Selection of these areas to draw appeared related to the theoretical study that I find myself totally involved in at the moment. My mind is currently trying to equate, to balance all the composite parts, looking for connections and links between information, visual exploration at this time reflecting this mental dilemma. Order from chaos...
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**Chapter Five – Observing Art Making Practice**


**Chapter Six – Research Synthesis**


**Chapter Seven – Art Education and Education Through Art**


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**Chapter Eight – New Directions for Reflective Art Teaching Practice**


Chapter Nine – A Discursive Conclusion


