

**COGNITIVE AND BEHAVIOURAL STRATEGIES FOR FOSTERING
CREATIVITY IN GRAPHIC DESIGN EDUCATION**

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Imagination is more important than knowledge

Albert Einstein

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OPSOMMING

KOGNITIEWE EN GEDRAGSTRATEGIEË VIR DIE BEVORDERING VAN KREATIWITEIT IN GRAFIESE ONTWERP OPLEIDING.

[**Sleutelwoorde:** Kreatiwiteit; Grafiese Ontwerp; Opleiding; Intrinsieke motivering; Self-regulering; Stres; Selfvertroue; Divergente denke; Kreatiewe prosesse; Studieprogram; Opvoedkundige riglyne].

Hierdie studie ontwikkel 'n metodologie vir die sistematiese en strategiese bevordering van kreatiwiteit in grafiese ontwerp opleiding op universiteitsvlak. Die proefskrif identifiseer vier sosio-psigologiese faktore wat 'n betekenisvolle invloed op grafiese ontwerp studente se kreatiewe vermoëns het, naamlik die vlak van intrinsieke motivering wat hul vir kreatiewe aktiwiteite het; hul vermoë om outonome, self-regulatiewe gedrag wat kreatiwiteit ondersteun te inisieer en in stand te hou; 'n sterk oortuiging in hul kreatiewe vermoëns en die beperking van negatiewe stres in die opleidingskonteks. Elk van hierdie faktore impliseer 'n verskeidenheid strategieë wat gebruik kan word om kreatiwiteit in grafiese ontwerp studente te maksimaliseer en te stimuleer. Dit sluit in sekere benaderings tot terugvoer en evaluasieprosedures wat kreatiwiteit ondersteun, die skep van 'n veilige, nie-kontroleerende, demokratiese atmosfeer in klasse, sowel as die doelbewuste gebruik van musiek en humor in die opleiding konteks.

'n Reeks kognitiewe strategieë wat gebruik kan word vir idee generering in grafiese ontwerp word voorgestel. Hierdie strategieë stimuleer divergente denke en is getiteld: 'Toevallige Assosiasie', 'Morfologiese Sintese', 'Metafore en Analogieë', 'Brein-kartering', 'Idee-kontrolelyns', 'Visuele Denke' en 'Sintuiglike Assosiasies'. Elke tegniek word beskryf in terme van sy unieke metodologie, voordele, kreatiewe potensiaal en sy toepaslikheid vir probleem oplossing in grafiese ontwerp. Die studie stel ook 'n taktiese benadering tot die kreatiewe proses voor en bespreek kognitiewe strategieë wat gebruik kan word vir die effektiewe uitvoering van elke fase in die kreatiewe proses. Hierdie strategieë verseker dat die totale spektrum kognitiewe aktiwiteite wat vereis word vir die suksesvolle uitvoering van die kreatiewe produk aangespreek word.

Die kognitiewe- en gedragsstrategieë wat in die proefskrif saamgevat is het die basis verleen vir die ontwikkeling van twee teoretiese raamwerke wat in voorgraadse grafiese ontwerp opleiding gebruik kan word om kreatiwiteit in studente te bevorder. Die twee raamwerke behels: (1) 'n Studieprogram in Kreatiwiteitsstudies bestaande uit 'n aantal leereenhede wat aan studente 'n teoretiese basis bied vir bevordering van hul kreatiwiteit en (2) 'n reeks Opvoedkundige Riglyne wat gemik is daarop om aan dosente 'n reeks didaktiese strategieë en praktyke te bied wat gebruik kan word vir die ondersteuning en stimulasie van kreatiewe vermoëns in grafiese ontwerp studente.

ABSTRACT

[**Key words:** Creativity; Graphic Design; Education; Intrinsic motivation; Self-regulation; Stress; Self-belief; Divergent thinking; Creative process; Learning Program; Educational Guidelines.]

This study developed a Methodology for the systematic and strategic fostering of creativity in graphic design education at university level. The thesis identified four social-psychological factors that have an effect on graphic design students' creative ability, namely their level of intrinsic motivation for creative activities; their ability to maintain autonomous, self-regulative behavior that is conducive to creativity; a healthy self-belief in their creative ability and the minimization of negative stress in the educational milieu where creative tasks are undertaken. Each of these factors imply a range of strategies that may be used to maintain and stimulate creativity in graphic design education, such as the use of certain types of feedback, evaluation procedures that supports creativity, the creation of a safe, democratic, non-controlling classroom climate or the deliberate use of music and humoristic activities in the educational milieu.

Additionally, a range of cognitive strategies that may be used for idea generation in graphic design are proposed. They include divergent thinking techniques, such as 'Random Association'; 'Morphological Synthesis'; 'Metaphors and Analogies'; 'Mind-mapping'; 'Idea Checklist'; 'Visual Thinking' and 'Sense Connections'. Each technique is described in terms of its unique methodology, advantages, creative potential and its applicability to graphic design. The study also proposes a tactical approach to the creative process, suggesting various cognitive strategies that may be used for each phase of the creative process. These strategies ensure that the whole spectrum of cognitive activities required for the successful production of a creative product is executed.

The sum of these cognitive and social-psychological strategies provided the basis for the development -of two theoretical constructs that may be implemented as part of an undergraduate graphic design curriculum to cultivate creativity in students. They are: (1) a Learning Program in Creativity studies that consists of a number of study units and aims to provide tuition in the theoretical foundation that students need to enhance their creative ability (2) a range of General Guidelines that aim to provide educators with a range of didactic strategies and practices to support and stimulate creative ability in graphic design students.

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CHAPTER 1

INTRODUCTION TO THE STUDY

Introduction

This chapter introduces the focus of the study and provides a motivation for the undertaking of the study. The main questions that were formulated to guide the study are provided as well as the aims of the study. The central theoretical statement of the thesis is outlined. The method of research is discussed with reference to the types of literature that were consulted for the study. Finally, an explanation of relevant terminology that is used in the thesis is provided.

1.1 Problem statement

This study was initiated by an apparent lack of a structured approach to the fostering of creative abilities in graphic design education. This need was identified and confirmed through a survey on various graphic design curricula nationally and internationally. The survey included eight major educational institutions in South Africa that offer graphic design training (listed in Annexure A). An Internet search on various graphic design syllabi across the globe (listed in Annexure B) further confirmed the apparent need for a structured educational program that provides lecturers and students with a framework to foster creativity systematically. A recent study published by Xu and colleagues (2005:65) reviewed creativity courses and programs offered at universities in Europe, North America, Japan and China. Their report indicates that creativity courses and programs (that offer creativity as a specific academic field) are found most frequently in fields such as business, education, psychology, engineering, science and technology. No institution that offers graphic design education was listed in this study, although the authors did conclude their report with the following remark: 'It is believed that, with further examination, creativity courses would be discovered in other subject areas such as architecture, literature, art, music and athletics'.

The notion that creative ability could be fostered deliberately in creative disciplines such as graphic design education (by means of a structured training program in creative thinking) is often treated with suspicion (de Bono, 1993:297). Generally, educational institutions that offer graphic design training seem to support the notion that creativity is by nature an intuitive right-brain activity that relies mainly on talent and inspiration and less on formal training (Oldach, 1995:40). Creativity is often linked to uninhibited, unstructured behavior (de Bono, 1993:xii). However, many authors and researchers on creativity argue that creative abilities

could be trained or taught successfully through structured training programs in creativity studies (Torrance, 1973:6; de Bono, 1993:6; Parnes, 1992b:3; Michalko, 1998a:15; Petty, 1997:23; Treffinger *et al.*, 1992:94; Cropley, 1997:85). These authors have indicated that it is possible to train the cognitive skills, techniques and required mind-sets that are required for high levels of creativity. Edwards (2003:91) affirmed that 'indeed, it is now understood through research that creativity can be taught...' Sternberg (2004:197) pointed out that students could develop their creativity by learning the attitudes with which they need to approach their work and learning the decisions they need to make. Davis (1991:240) stated that creativity may be enhanced by helping students to meta-cognitively understand the subject of creativity. He argues that this increased understanding of creativity would increase creativity consciousness, demystify creativity and increase creative ideas and products. Thomas Edison's (in Simonton, 1997:23) widely quoted remark that creativity is 'one per cent inspiration and ninety-nine per cent perspiration' implies that the creative activity is, in fact, an incremental process that has a structure and requires organization and constant effort to maintain. It suggests that a structured approach to the training of creative abilities is plausible.

The survey on national and international graphic design curricula that was conducted for the purpose of this study (see Annexures A and B) indicated that several tertiary institutions in South Africa rely on the execution of creative task-oriented practical projects for the development of creativity in students. In most of these instances, creative skills are viewed as a side effect and not as a primary object of study. It seems that the established mode of graphic design training in South Africa and abroad emphasizes instruction aimed at proficiency in the technical and conceptual execution of design products. According to the survey in most graphic design institutions around the globe, formal tuition in creativity studies is largely neglected. Yet, it may be argued that the best way to cultivate creativity is to learn more about the components that comprise it (Dacey & Lennon, 1998:8). Tuition which familiarize students with an understanding of the factors that foster and block the flow of creative energy, as well as training in the cognitive and behavioral strategies that could be applied to purposefully stimulate creativity, is offered to a limited extend in educational centers in South Africa.

However, as indicated earlier, several systematic approaches to the teaching of creative skills have been suggested for other disciplines such as engineering (Court, 1998:141-155; Blicblau and Steiner, 1998:55-66; Tornkvist, 1998:5-13), management (Westwood and Low, 2003:235-260) and even nursing (Manion and Haukkala, 1994:14-18; Gilmartin, 1999:1-8). This may be due the fact that students in these disciplines do not regard themselves as

being creative and are appreciative of formalized creativity techniques to guide their thinking. Court (1998:147) confirmed this by saying: '...most engineering students find creative thinking unfamiliar territory and very hard work as it is unnatural to their normal thinking'. Although this may not be the case with graphic design students, it is argued that many of the systematic creativity strategies documented in literature (that are often applied to other disciplines) may be valuable aids for enhancing creative abilities in graphic design students. In another interdisciplinary review of creativity courses that exists in other disciplines than art, Murdock (2003:354) called for the necessity that 'teachers and administrators should take the necessary steps to develop and imbed creativity programs in colleges and universities through formal degree pathways or as explicit courses in a variety of disciplines'. This may include the discipline of graphic design.

The need for tuition that enables graphic design students with an ability to be creative when the need arises, is evident in the fact that once a student graduates to enter the professional world of the graphic design industry, the ability to be creative will be a requirement at the workplace on a daily basis, irrespective of internal or external factors that may influence his/her creative ability. In view of this apparent lack, the main objective of this study is to develop a comprehensive methodology for the fostering of creativity in graphic design students that may be implemented as part of an undergraduate curriculum on tertiary level. It seems essential that students understand the impact of certain environmental and social-psychological factors on their creative ability and are enabled to manage these factors effectively to maintain their creative energy. Furthermore, if students are instructed in a range of cognitive strategies that may be used to intentionally stimulate creativity, it could help them to overcome creative blocks and maximize their creative ability. The proposed Methodology, which is the contribution of this study, aims to provide tuition and educational guidelines that empower graphic design students to achieve the above mentioned abilities.

1.2 Aims of the study

With the above-mentioned objective in mind, the study aims to develop two educational constructs that may be implemented in the context of graphic design education:

- (1) A Learning Program for creativity studies:** The Learning Program aims to provide tuition in the theoretical foundation that students need to enhance their creative ability. Consisting of a number of study units combined with recommended instructional methods, it aims to instruct students on techniques and behavioral strategies needed to maximize creativity.
- (2) General Guidelines for fostering creativity:** These guidelines aim to provide educators with a range of educational strategies and practices which could be

employed in conjunction with the Learning Program to support and stimulate creative ability in graphic design students.

The implementation of a proposed Learning Program in creativity studies as part of an undergraduate curriculum in graphic design, is based on the premise that if graphic design students have a sufficient understanding of the social-psychological factors which influence their creativity, as well as proficiency in techniques designed to stimulate creativity, they may be empowered to utilize this knowledge to purposefully enhance their own creative ability. In addition, if educators follow the proposed General Guidelines that support the principles contained in the Learning Program, it is hypothesized that creative ability could be purposefully fostered in graphic design students.

These two interdependent constructs of the proposed Methodology (the General Guidelines and the Learning Program) are intended for use in conjunction with each other to maximize the beneficial effects of the Methodology on students' creativity. To guide the development of these two constructs, the following questions were formulated:

- what is the definition of creativity?
- which factors influence an individual's creative ability?
- can creativity be taught?
- which cognitive strategies could be followed to foster creativity in graphic design education?
- which behavioral strategies could be followed to foster creativity in graphic design education?
- what should the core content of a study guide on creativity in graphic design education be?

Based on these questions, the aims of this study are:

- to formulate an operational definition of creativity appropriate to the context of graphic design education;
- to determine which factors influence students' creative ability in graphic design education;
- to determine whether it is possible to teach creative ability;
- to establish a range of cognitive strategies that could be followed to foster creativity in graphic design education;
- to establish a range of behavioral strategies that could be followed to foster creativity in graphic design education;
- to determine the core content of a study guide on creativity that may be used in graphic design education.

1.3 Central theoretical statement

With regard to the above-mentioned problem statement and aims of the study, the following central theoretical statement was formulated:

It should be possible to purposefully enhance students' creative abilities with the aid of a structured Methodology, consisting of a Learning Program that enable students to learn the skills and techniques required for high levels of creativity and a range of General Guidelines that inform educators to support and maximize creativity in the educational context.

1.4 Method of research

The proposed Methodology is a theoretical construct that was synthesised from various creativity models, theories, training programs, research studies and observations that are documented in literature on creativity. Literary sources included books, the Internet, educational DVD's, research articles and conference papers. Scientific research and writing on creativity has been documented since the sixteenth century (Edelson, 1999:11). However, since Guilford's 1950 presidential address to the American Psychological Association called for more research on creativity (Guilford, 1967b:3), the field of creativity studies has been expanded significantly. The last two decades have been especially productive in terms of creativity research (Runco, 2003:137).

The development of creativity is a desirable pursuit in many fields such as entrepreneurial studies, management, marketing, leadership and business studies to help organizations and individuals stay ahead and adapt to the fast changing climate of contemporary life. Indeed, studies that inform these fields to train or stimulate creativity abound in literature. Ironically, in the discipline of graphic design – a discipline whose backbone is creative ability – relative few such studies are to be found in literature. This lack may be ascribed to the fact that the field of graphic design has a relative short research history. It may also be attributed to the generally held notion that graphic designers are naturally creative and are therefore considered not to need strategic methods to enhance creativity. Therefore, a study that aims to adopt a strategic approach to the purposeful fostering of creative ability in a graphic design education, is bound to consider studies that have been done in other fields such as those mentioned earlier to inform the study.

Thus, the proposed Methodology culminates from a vast range of interdisciplinary sources that include behavioral, biological, cognitive, developmental, neurological and social perspectives on creativity. Indeed, from a literature study that was conducted prior to the study it was established that creative ability does not arise only from cognitive skills but from a constellation of psychological, affective, motivational and personal properties. It suggested that if creative ability is aimed at being fostered intentionally in an educational context, a

comprehensive approach that addresses several of these aspects should be followed. Therefore, the literature that was consulted for the development of the proposed Methodology endeavored to include a wide spectrum of diverse perspectives on creativity.

The literature that were consulted for this study could be divided roughly into two categories: Firstly, sources with a cognitive focus on creativity that deal with thinking strategies that may be used for effective idea-generation or to execute the various phases in the creative process (e.g. de Bono, 1993; Michalko, 1998a; Petty, 1997; Treffinger, et al., 1992). Secondly, sources that deal with social-psychological dimensions of creativity such as the relationships between creative ability and intrinsic motivation (e.g. Amabile, 1983; Pintrich and Schunk, 1996), self-regulation (e.g. Deci and Ryan, 1992; Zimmerman, 2001), self-belief (e.g. Grovè, 1992; Eiffert, 1999) and stress (e.g. Jensen, 1995; Starko, 1995). In some instances, both categories are addressed in sources that aim to provide a comprehensive viewpoint on the factors that influence creativity (e.g. Parnes, 1992b; Cropley, 1997). This division in the literature that was consulted is reflected in the chapter layout of the thesis: Part 1 deals with social-psychological (or person-related) factors that influence creativity and Part 2 that deals with cognitive (or product-and process-related) strategies for the fostering of creativity.

Although the incorporation of several social-psychological perspectives into the thesis plays an important role to provide a comprehensive approach to the fostering of creativity, it was not the aim, nor is it in the scope of this thesis to offer in-depth studies of each of these fields. When aspects of psychology or neurology, for example, is referred to in the thesis, they are intended to provide rudimentary understandings of these aspects that are regarded as essential for the purposeful fostering of creative abilities in students. The variables that were included in the proposed Methodology were selected on the basis of two motives: firstly, they represent the prerequisites for creativity that are researched and documented *most frequently* in literature on creativity - indicating their importance for the maintenance of creative ability – and secondly, they are particularly relevant and applicable to the context of graphic design education.

1.5 Explanation of terminology

Since a large body of the literature that was consulted for this thesis originates from the U.S.A., the American version of English is utilized in the thesis. The use of specific terms in the thesis needs to be clarified to prevent confusion about their potential meanings in the thesis. The following terminology is clarified:

- **‘Tertiary’ education:** The term ‘tertiary’ education is used to indicate university or college level training. The term refers to higher education that usually follows after traditional high-school education.
- **‘Techniques’ and ‘strategies’:** The term ‘technique’ is generally used to refer to a practical method applied to a particular task (Collins, 1994:889). The term, ‘strategy’ is described as a ‘long-term plan for success’ (Collins, 1994:855). For the specific requirements of this thesis, the word ‘technique’ refers to a systematic short-term step-by-step procedure employed to achieve a desired result and is usually task-related. The term ‘strategy’ refers to the intentional use of a particular cognitive or behavioral approach to achieve a long-or medium term result.
- **‘Methodology’ or ‘model’:** The term ‘methodology’ is usually used to describe a system of methods and principles applied to a particular discipline (Collins, 1994:592). The term ‘model’ could be used to refer to a standard to be imitated or a representative form or style (Collins, 1994:542). For the purposes of this thesis the term ‘methodology’ refers predominantly to the proposed Methodology, that is, a system of methods and principles proposed for the fostering of creativity. However, since the proposed Methodology is presented as a ‘standard to be imitated’, the two terms ‘model’ and ‘methodology’ are occasionally used synonymously in the thesis. To distinguish it from the general use of the word ‘methodology’, the proposed Methodology is written with a capital letter in this thesis.
- **‘Learning Program’:** The term ‘Learning Program’ is derived from the terminology that is generally used in Outcome-based Education (OBE), which is the current educational approach used in South Africa. The proposed Learning Program is presented in Chapter 9 according to the style used in OBE. The following definition of the term is provided in Chapter 9:

A learning program consists of courses or units of learning (learning material combined with methodology), by which learners can achieve agreed-upon learning outcomes (Van Wyk, 1999:103).

The meaning of other OBE terminology such as ‘outcomes’ and ‘units’ are explained in the introductory discussion to the proposed Learning Program. As in the instance of the term ‘Methodology’, the terms ‘Learning Program’ and ‘General Guidelines’ are written with capital letters in this thesis to distinguish it from the general use of the words ‘learning program’ and ‘general guidelines’.

- **'Person-related', 'product-related' and 'process-related':** The term 'person-related' is used in the thesis to refer to factors or strategies that are usually social-psychological or behavioral in nature. The terms 'process-related' and 'product-related' refer to cognitive dimensions of creativity and are related to techniques that are effective for the execution of the creative process. Part 1 of the thesis focuses on person-related strategies to foster creativity and Part 2 focuses on product-and process-related strategies.

CHAPTER 2

PRELUDE TO THE PROPOSED METHODOLOGY FOR FOSTERING CREATIVITY IN GRAPHIC DESIGN EDUCATION

Introduction

Chapter 2 aims to introduce the proposed Methodology through a number of discussions that address issues relevant to the formulation of the Methodology. The first discussion provides a definition of creativity specifically formulated for the purposes of this thesis (2.1). The variables addressed in the definition relates to the educational emphasis of the proposed Methodology developed for the purposeful enhancement of creativity in graphic design training, which is the main aim of this research project. In order to arrive at the proposed definition, reference is made to various other definitions of creativity and their underlying theoretical frameworks as documented in the literature on creativity. The purpose of the proposed definition is to provide an explanation of the inherent meaning of the word 'creativity' whenever it is referred to in the context of the proposed Methodology.

Section 2.2 provides an overview of several factors that could potentially affect creativity as well as reference to certain prerequisites for creativity that have been documented, researched and incorporated into models for creative behavior. The purpose of this discussion is to illustrate, in view of the complex network of variables that could potentially influence creativity, how vulnerable creative ability is. Since the proposed Methodology focuses mainly on influences that could affect creativity within the educational context, reference is made to factors that could influence creative ability *outside* the classroom in a wider social and cultural environment. It is recognized that it is not plausible to control all the factors that influence creativity, especially not those factors that affect individuals outside the educational context. The discussion aims to illustrate that students may be susceptible to a number of factors that could influence their creativity outside the classroom which cannot be effectively managed within the parameters of the proposed Methodology. Recognizing these potential influences is imperative in order to maintain realistic expectations of the potential effectiveness of the proposed Methodology.

The next discussion (2.3) addresses a question that is of fundamental importance to the purposes of this thesis, namely: can creativity be taught? The discussion aims to arrive at a satisfactory answer to this question through an investigation of a number of training programs, models and theoretical frameworks documented in literature that aimed to

deliberately foster creativity. The main approaches and recommendations for the effective training of creative ability are identified. The final discussion of this chapter (2.4) introduces the proposed Methodology with reference to the main prerequisites for creativity that form the basis of the strategies proposed in the Methodology. Each of these strategies is briefly introduced, with reference to the main theoretical frameworks that underlie them. Since these strategies shall be addressed at length in the following chapters of this thesis, this section merely aims to offer a brief insight into the main components of the proposed Methodology.

2.1 Defining creativity

A strategic approach to the teaching of creativity relies to a large extent on the variables addressed in an operational definition for creativity, formulated to address the specific aims of the thesis. This was confirmed by Treffinger (1993:13) when he answered the question whether creativity can be deliberately enhanced through training, saying: 'the answer unequivocally is, if one chooses variables carefully to represent a realistic operational definition of creativity, yes, you can enhance a subject's performance significantly'. The importance of an appropriate definition when aiming to teach creativity was also highlighted by Paul Torrance. Torrance, who spent a lifetime doing research on creativity, developed the well-known *Torrance tests of creative thinking* and promoted several training programs in creative thinking. He defined creativity as 'the process of sensing gaps or disturbing missing elements; forming ideas or hypotheses and communicating the results; possibly modifying and retesting the hypotheses' (in Houtz, 2003:5).

Although Torrance's definition has been recognized by several authors, there is still no universally accepted definition of creativity. The field of creativity has been studied from so many frequently incompatible theoretical perspectives, each with its own assumptions, methodologies and biases that a unitary definition of creativity doesn't seem plausible. As de Bono (1993:3) phrases it, 'creativity is a messy and confusing subject and seems to range from devising a new toothpaste cap to Beethoven's writing his Fifth Symphony'. However, James Marra (1990:23), in his book on creativity in the advertising industry, has pointed out that the apparent complexity involved in the formulation of a satisfying definition for creativity should not obstruct attempts to do so. He remarked: 'creativity is not always black and white. Often, it's gray. But, that doesn't mean it can't be understood for its grayness, and it doesn't mean that grayness is indefinable or unapproachable'.

The mystique associated with creativity is often magically portrayed as a 'light bulb in the mind' (Woodman and Schoenfeldt, 1989:80). The popular definition of creativity as the result of instantaneous inspiration has been prevalent for many centuries. Contrary to this view, several authors (Mac Kinnon, 1971: 194; Amabile, 1983:77; Petty, 1997:137; Pintrich and

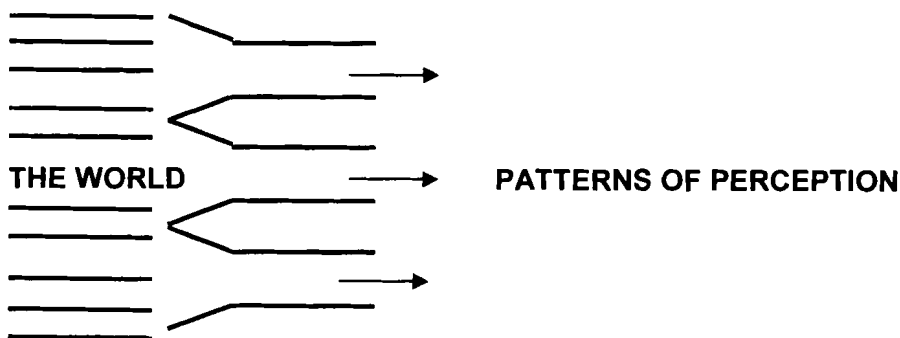
Schunk, 1996:263) have emphasized the fact that creative production is a matter of sustained effort that requires commitment and persistent attention. Examples from the past are often used to illustrate this fact: Picasso's masterpiece, *Guernica* underwent many revisions and was preceded by several painstaking preparatory sketches; Thomas Edison failed thousands of times to discover the electric light bulb, but remained unwilling to give up (in Petty, 1997:136).

Around 500 BC, the ancient Greeks believed inspiration for creativity came from the gods and even invented heavenly creatures - the 'Muses' - as supervisors of human creativity (Cave, 1999). The word 'inspiration' is based on a Greek word meaning the 'God within'. But, as Woodman and Schoenfeldt (1989:80) have pointed out, the long tradition of creativity being viewed as a magic, instantaneous process has overshadowed the necessity of rational, structured thought in the creative process. They contended that 'creativity is not a light bulb in the mind as most cartoons depict it. It is an accomplishment born of intensive study, long reflection, persistence and interest'. The fact that the creative process includes the conscious, rational seeking of answers and solutions to creative problems has been documented throughout history. For example, Van Gogh's letter to Rappard describes drawing a model repeatedly until he attained an original result (Starko, 1995:109). Starko quotes van Gogh as he wrote: 'the first attempts are absolutely unbearable. I say this because I want you to know that if you see something worth while in what I am doing, it is not by accident but because of *real intention and purpose*' (author's italics).

Dacey and Lennon (1998:202) also stressed the fact that creativity cannot be defined as a 'magical' right brain process that excludes logical and rational thought. They pointed out that contrary to the popular notion that creativity results mainly from the right brain there exists strong evidence that the brain works as a unit and that creative thinking involves both left and right brain functions (Dacey and Lennon, 1998:204). Creativity reflects originality and appropriateness, intuition and logic. It requires both hemispheres (Runco, 2004:664). According to de Bono (1993:33), it is possible to see which parts of the brain are working at any given moment by doing a PET (Positive Emission Tomography) scan. This instrument shows neurological activity as little flashes of radiation captured on a film. According to de Bono (1993:34), these flashes indicates clearly that when a person is doing creative thinking, both left and right hemispheres are active at the same time. While he recognizes some merit in the right/left brain notation for the identification of dominant thinking styles, de Bono (1993:35) argues that the basic concept is misleading because it suggests that in order to be creative 'all we need to do is to drop (or reduce) the left-brain behavior and use right brain behavior'.

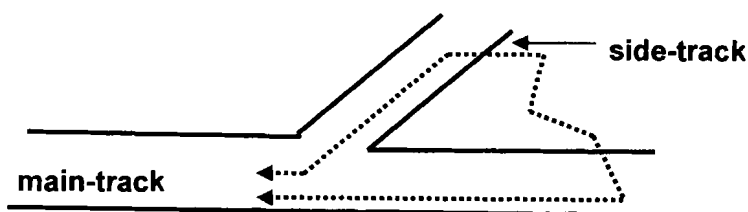
The formulation of a definition of creativity is to a large extent reliant on an answer to the question of which cognitive processes in the human brain are responsible for creativity. De Bono (1993) aimed to answer this question in his attempts to determine the origin of creative ideas in the human brain. Through an investigation of the neurological mechanisms of the human brain, de Bono (1993:9-22) proposed a conceptual model that explains how creative ideas come into being. His theory is summarized in his 1993 publication, *Serious creativity*. In this book, he explains how the human brain works as a 'self-organizing system' (de Bono, 1993:10-11). According to this theory, all the incoming information in the brain organizes itself into preferred thinking patterns without the help of an external organizer (de Bono, 1993:12). These preferred thinking patterns are used to recognize information, resulting in habitual 'perceptions' of the world, as illustrated in Figure 1:

Figure 1: Simplified illustration of the pattern-forming behavior of the human brain (adapted from de Bono, 1993:12).



According to de Bono (1993:13), creative thought occurs when these habitual patterns of perception are overturned, resulting in a change in these regular patterns. De Bono points out that when we think creatively, the symmetry of these neural patterns is broken by a 'side-track' in the pattern, which can be entered from another point and followed back to the starting point in the 'main track', as indicated in Figure 2.

Figure 2: Simplified illustration that indicates how creative ideas come into being in the human brain (adapted from de Bono, 1993:13)



This process implies that the starting point of the thinking pattern that is associated with creative idea generation, is 'illogical', but ends up at a logical point – the 'main track'. De Bono's postulation that a creative idea is initially regarded – in terms of brain patterns - as

illogical, reminds of Albert Einstein's remark, saying that: 'if at first, the idea is not absurd, there is no hope for it' (Mycoted, 2003). However, de Bono (1993:15; 1995:14) emphasizes that we only recognize ideas that have a logical link-back. Thus, when novel and innovative ideas occur in the brain because of a sudden switch in perception, it *eventually* makes sense and appears logical. The asymmetry of patterns caused by a change in perception means that an idea may be logical and even obvious in hindsight but invisible to logic in the first place (de Bono, 1993:57). Thus, according to de Bono (1995:14) creativity is an 'unnatural process'. He points out that cutting across patterns is not natural behavior for the brain. The purpose of the brain is to establish and use routine patterns. De Bono (1993:114) believes that such a switch in perception that could result in creative thinking can be deliberately induced by the use of certain thinking techniques, called 'lateral' thinking. These techniques (discussed in Chapter 7) 'overcome' the natural tendency of the brain to think in patterns.

The significance of de Bono's work for the formulation of a definition for creativity lies in his explanation of creative ideas as being novel (deriving from irrational thought) *and* logic (deriving from rational thought) simultaneously. This dual character of creative ideas is also evident in Torrance's definition of creativity (in Houtz, 2003:5) when he refers to 'modifying and retesting the hypotheses' (thus thinking logically) to determine the validity of novel ideas (generated by unconventional, 'out-of-the-main-track' thinking). Likewise, Amabile *et al.* (1996:1) defines creativity as 'the production of *novel* and *useful* ideas in any domain' (author's italics). The two qualities of being original and at the same time being logic or appropriate have been recognized by several authors on creativity as a hallmark of truly creative ideas (Starko, 1995:5; Isaksen, *et al.*, 1993:31; Marra, 1990:17; Amabile, 1983:67; Vernon, 1989:94; Dacey and Lennon, 1998:179). Adam (1996:52) also notes that although the literature is replete with various definitions of creativity with varying specificity and generality, the two elements that underlie most of the definitions are *originality* and *appropriateness*.

Cropley (1997:89) described these two qualities in his definition of creativity as 'effective surprise' or 'effective novelty' (Cropley, 1999:253). He pointed out that if creative ideas lack the elements of relevance and effectiveness, every crazy idea, irrational behavior, or absurd product that surprised people would be creative. Novelty can be produced in the form of mere self-expression (daubing paint on paper, writing text in any way that pleases the writer, or picking out notes at random on the piano) or of simple production of variability (doing things differently from the usual regardless of accuracy, meaning, sense, significance, or interestingness). However, it can also satisfy technical, professional, aesthetic, or scholarly criteria. The latter kind of novelty produces a shock of recognition in observers that generates 'effective surprise'. Without effectiveness, novelty is more likely to be a matter of the pseudo-creativity that characterizes simply being outrageous or nonconformist, or the

quasi-creativity that occurs in, for instance, daydreaming. These have elements of creativity such as fantasy, but lack task relevance and similar properties that are necessary for creative giftedness (Cropley, 1999:254).

The integration of logic, rational thinking with new or original thinking is most evident in Guilford's well-known definition of creative thinking that proposed a distinction between 'convergent' and 'divergent' thinking (in Dacey and Lennon, 1998:172). Divergent thinking is described as the intellectual ability to generate many original, diverse and elaborate ideas, while convergent thinking refers to the intellectual ability to logically evaluate, critique and select the most successful idea from a number of ideas (Dacey and Lennon, 1998:174). Divergent thinking is essential to ensure the novelty of creative products whereas convergent thinking is fundamental to the appropriateness of a creative product as well as the effective application of the product (Cropley, 1997:92). According to Charles Cave (1999), defining creativity 'to include appropriate application throws the whole subject into a different light'. He notes that while ideas can come in seconds, application can take days, years or even a lifetime to realize. Furthermore, while ideas can arrive in a single flash, application necessarily involves a process consisting of several distinct phases'. This statement of Cave, as well as those of other authors referred to, suggests a definition for creativity that implicates the merging of two seemingly paradoxical thinking processes: structured, logical thinking in combination with unstructured, 'out-of-the-main-track' thinking, as de Bono (1993:13) described it. It seems imperative, thus, that any functional definition that serves as a basis for teaching creativity, should at least include reference to both styles of thinking.

Amabile (1983) has published an influential body of research on several aspects of creativity such as intrinsic motivation and the effect of rewards on creativity. For the purposes of her research, she formulated a definition of a creative product. Again, the twofold quality of the creative product and process is evident in her definition. Amabile (1992:56) proposed a product or idea is creative when it is '*a novel and appropriate response to an open-ended task*' (author's italics). However, she has found this conceptual definition to be unsuited for direct application to research and formulated a more specific operational definition that relies on the consensus of experts. Thus, she redefined creativity as 'the production of responses or works that are reliably assessed as creative by appropriate judges'.

Vernon (1989:94) agreed that acceptance by experts should be included into a definition of creativity when he proposed the following definition: 'creativity means a person's capacity to produce new or original ideas, insights, restructurings, inventions, or artistic objects, which are *accepted by experts* as being of scientific, aesthetic, social, or technological value' (author's italic's). However, Hayes (1989:135) considered the process of social judgment as a complex matter. He argues that expert judgments are sometimes highly subjective and are

frequently influenced by 'irrelevant' factors. Indeed, some contemporary artists and 'experts' see beauty and power in graffiti that escape much of the general public (Starko, 1995:6).

Another aspect that complicates the problem of social judgment in a definition of creativity is that the evaluation of creative products could change with the passage of time (Vernon, 1989:94). As Starko (1995:5) pointed out, van Gogh's works were not accepted by the public of his time and asks: 'were they not appropriate? What if they had never been accepted? Would they have been creative?' Furthermore, he pointed out, if a researcher at the University of Michigan should work for years to engineer a gene transfer to cure a particular disease only to discover that a researcher at Stanford had published the same techniques only two weeks before, would the Michigan researcher's work no longer be creative? Starko concluded by asking, 'must elementary school children devise ideas that are unique in the world before their efforts can be considered creative?' Therefore, it seems the notion of social recognition as part of a definition of creativity remains to be a problematic issue.

Starko (1995:6) attempts to resolve this matter when he proposes an alternative to the inclusion of expert approval into a definition of creativity. He argues 'to be considered creative, a product or idea must be original or novel *to the individual creator*' (Starko's italic's). Taking cognizance of the fact that most definitions of creativity include the two qualities of novelty and appropriateness, Starko (1995:5) regarded a creative idea as appropriate if it meets a specified goal or criterion. He points out that in most creative disciplines general consensus exists about the criteria that evaluate the appropriateness of the creative product. Most paintings, for example, must have some balance and composition to be considered successful (Starko, 1995:6). Yet, Starko (1995:7) contended that the issue remains complex, since, as it has been pointed out, norms and criteria can change within different times and contexts. As indicated earlier in the example of van Gogh's work, he was originally considered dysfunctional. Society's *revised* standards considered him creative. While styles of painting vary and evolve, Starko acknowledges that works of art are seldom considered creative unless they are eventually appreciated by some audience, pointing once again to relevance (or appropriateness) as a required component in a definition of creativity.

In his description of successful creative work in the advertising industry, James Marra (1990:22) emphasizes the inseparability of the two components of 'newness and relevance' in order to achieve optimum results with creative advertising ideas. In many ways, Marra argues, the two qualities become so inseparable that they begin to overlap and superimpose themselves on each other. He explains it as follows:

For instance, as receivers of those ideas, we begin to notice the newness simply because it is expressed as relevant to us, and we notice the relevance because it is

so new. This combination serves to energize creative ideas. It helps them rise above other, less inspired ideas and soar beyond the ordinary and mundane.

Therefore, according to Marra, it is the *combination* of relevance and novelty that renders creative ideas to be regarded as truly creative. The two qualities of being relevant and novel simultaneously are of particular relevance to the discipline of graphic design where functionality and applicability of a creative concept is as important as the originality of the idea. Marra's observations highlight, once again, the importance of the two qualities of originality and functionality for a definition of creativity.

Another aspect that may be considered relevant to the formulation of a definition of creativity is the cognitive skills that, according to the *Torrance tests of creative thinking*, reflect creative ability. These tests were developed by Paul Torrance (in Rose and Lin, 1992:124) and are supported by a large body of evidence indicating their reliability and validity over time and in different cultures. They are widely recommended as the best standardized measures to determine the level of creative ability in individuals (Rose and Lin, 1992:126). Amongst other skills that are tested, such as originality and flexibility, Torrance places a high priority on 'fluency' - the ability to produce a large number of ideas with words or figures (Cropley, 1997:105). According to Torrance (in Cropley, 1997:104), truly creative people are capable of producing a great quantity of ideas before the most appropriate solution is selected. The emphasis on the generation of a large quantity of ideas as a hallmark of creativity has also been recognized by several other authors on creativity such as Osborn (1992:4), Michalko (1998a:85) and Petty (1997:15).

It seems therefore that a definition of creativity as a cognitive ability should at least incorporate two aspects: (1) the product that is created should be both original and functional and (2) the creator should have an ability to produce large numbers of ideas during the creative problem solving process. These two constructs also seem to be relevant for a definition which relates to the context of graphic design education. However, the implications of the observations raised earlier by Starko (1995:5) on the acceptance of creative products by either society or a body of experts need to be considered for the formulation of a definition of creativity appropriate to the educational context of graphic design. Starko (1995:6) addressed the question whether the creative product should be completed to the satisfaction of a body of external experts (as Amabile indicated), or to the satisfaction of the individual creator, or whether it should measure up against a set of predetermined criteria or goals.

In the case of graphic design education, it is problematic to suggest that a creative product should exclusively satisfy the individual creators (the students) without the consent of a more experienced tutor, since students are still in the process of learning. On the other hand,

acceptance of the creative product by expert tutors without the participation of the students is also problematic since it denies a learner's right to decision making. Starko's (1995:6) suggestion that the creative product's appropriateness should be determined by a set of objective criteria could also prove to be problematic, since objective criteria may be filtered through a process of subjective judgment by either the creative individual or the expert tutor. It therefore does not resolve the question as to which party's satisfaction the creative product should be done. However, these problems may be resolved if a definition stipulates that the creative product should be completed to the satisfaction of *all major parties involved in the educational process*. These parties may implicate the creative student, the educator as well as the 'client' and 'target market' that the work is created for.

Therefore, for the purposes of the formulation of a definition applicable to graphic design education, three constructs seem to be important:

- the qualities of originality and functionality as prerequisites for the creative product;
- the ability to generate large numbers of ideas for creative problem solving;
- the creation of a product to the satisfaction of all major parties involved in the educational process.

Based on these three constructs, the following definition, which is regarded to be applicable to the context of graphic design education, is proposed:

Creativity is the ability to generate a large number of original responses to a specified creative problem that leads to a functional solution and results in a satisfactory creative product to all major parties involved in the educational process.

The proposed definition refers to 'a *specified* creative problem' and differs in this regard from other definitions for creativity that either implicate the existence of a problem to be solved indirectly, such as definitions proposed by Torrance (in Houtz, 2003:5) and Starko (1995:6), or refer to creative problems as an 'open-ended' tasks – as in Amabile's definition (1992:56). However, reference to a 'specified' problem in the proposed definition is relevant to the discipline of graphic design since the creative problems presented in this discipline usually center around a set of specifications determined by the particular needs of a client. It is therefore expected, as implicated by the proposed definition, that graphic design students should consider these specifications when they attempt to solve a creative problem.

As in the instance of most other definitions of creativity, the proposed definition is not an exact framework without shortcomings. Still, the definition is sufficient to function as a framework to describe creativity as the activity that is targeted for improvement in graphic design education. Although the proposed definition explains creativity as mainly a cognitive activity, the following discussions intend to illustrate, however, that the cognitive skills

involved in creativity tend only to occur in a matrix of motivational, personal and situational factors.

2.2 Factors that influence creativity

This section provides a general discussion of the various factors that could potentially affect a student's creativity within the educational milieu, as well as in a wider social and cultural context. The discussion offers a broad overview on the complex network of variables involved in creative behavior. It highlights the interrelated and interdependent complexity of a great number of factors (not only those in the proposed Methodology for fostering creativity) that could act as inhibiting or stimulating factors for creative ability. The main aim of this discussion is to indicate that, besides the factors that are included in the proposed Methodology, there remain a great number of *other variables* that may affect creativity. Although the variables that are included in the proposed Methodology may be related to some factors that are referred to in this discussion, they are separately introduced later in this chapter and shall be discussed individually and at length in the following chapters.

As it was mentioned in Chapter 1, the variables that are included in the proposed Methodology were selected on the basis of two reasons: firstly, they represent the prerequisites for creativity that are researched and documented *most frequently* in the literature on creativity - indicating their importance for the maintenance of creative ability – and secondly, they are particularly relevant and applicable to the context of graphic design education. Although the deliberate control of these proposed variables may be of significant importance to foster creativity in graphic design students, it is imperative to realize, that besides these variables, there may be a number of other – sometimes difficult to control - factors that could influence their creativity, such as genetics, personality or socio-economic disadvantages. These 'other' influences, as well as influences related to the proposed variables, are now introduced.

Studies, theories and models of creativity that relate to factors that influence creativity have generally focused on four areas, often referred to as the four 'p's' of creativity: person, product, process and press (Couger, 1995:2). In each of these areas, different theoretical views, methods of research and instrumentation have forged a wide range of approaches to the field. Studies that investigated the creative *person* (Eysenck, 1993:147-178; Houtz, 2003:99; Runco, 1997:45) tend to focus on personal characteristics, family dynamics or essential abilities of individuals as the main determinant in creative ability. Those authors (Marra, 1990: 62-93) who study and theorize about the creative *product* itself aim to determine what makes a product creative, or how creative ideas are different from other ideas. Receiving the most attention, theories and models that have been organized around

the creative *process* examine the mechanisms and phases involved in a creative act (Parnes, 1992a:133-153; Petty, 1997:29-170). Finally, investigations on the aspect referred to as *press* emphasize the dynamics between creative individuals and the environmental forces that may affect creative ability (Woodman and Shoenfeldt, 80-81; Amabile, 1983: 76-140). Many theories of creativity (e.g. Cropley, 1997:98; Dacey and Lennon, 1998:10), especially contemporary theories, examine all four areas in an attempt to arrive at a comprehensive view of the determining factors in creative behavior.

In their attempt to determine the salient factors that collectively make creativity most likely to develop, Dacey and Lennon (1998:10) proposed a model that describes creativity as the result of an intricate network of several interactive influences. From their compilation of factors that affect creativity, they have constructed a model that highlights five determining forces, from the smallest environment, the brain cell, to the largest environment, the world culture (Dacey and Lennon, 1998:10-12). They described these forces as follows:

- biological features (including micro-neurons, hormones, IQ, regulatory genes, brain development, hemispheric dominance, and inter-hemispheric coordination);
- personality characteristics (for example, tolerance of ambiguity, risk taking, and delay of gratification);
- cognitive traits (for instance, the ability to make remote associations and lateral thinking);
- micro-societal circumstances (such as relationships with family and friends and type of living quarters);
- macro-societal conditions (including type of neighborhood and work, educational, religious, ethnic, legal, economic, and political environments).

Dacey and Lennon (1998:12) emphasized that each factor influences the other factors bi-directionally. They noted that in fact, more than just influencing each other, the five variables are embedded in each other uniquely in every individual. None of the variables can be understood except in the context of the others. For example, the flow of certain neurotransmitters (thus biological factors) could potentially enhance cognitive ability to produce high-quality remote associations, leading to the generation of novel ideas. Simultaneously, the cognitive activity of producing remote associations spurs on the flow of neurotransmitters in the brain.

Van Demark (1991:26) also notes the complexity involved in the interaction of the various factors - relating to the individual, other people, society and the environment - that could influence creativity. These factors are indicated in Table 1.

Table 1: Potential interacting factors affecting the creative capabilities of the individual

(Van Demark, 1991:26)

SELF	OTHERS	SOCIETY AND ENVIRONMENT
Intellect	Trust	Upbringing
Memory	Respect	Culture
Recall	Acceptance	Nationality
Logic	Tolerance	Customs
Concentration	Dependability	Religion
Concepts	Responsibility	Affluence
Thinking patterns	Understanding	Poverty
Curiosity	Sensitivity	Comfort
Intuition	Compassion	Education
Imagination	Consideration	Community
Perception	Communications	Organisations
Creativity	Cooperation	Institutions
Self-esteem	Flexibility	Government
Self-worth	Honesty	Leadership
Attitudes	Caring	Minority
Emotions	Sharing	Distractions
Feelings	Support	Safety
Discipline	Loving	Climate
Awareness	Sense of humor	Time
Control	Domination	Regulations

This table demonstrates the intricate network of factors that could potentially influence creative ability. Van Demark (1991:26) pointed out that these factors interact with each other in many different ways, resulting in thousands of potentially different interactions. Recognizing the complexity involved in all these interactions, he concluded: 'no wonder we have trouble when we try to pinpoint ways to enhance our own or others creativity' (van Demark, 1991:27).

Woodman and Schoenfeldt (1989:80) pointed out that a wide variety of influences often account for individual differences in creativity. As part of their *Interactionist model of creative behavior* (Annexure C) they described a range of factors that are responsible for individual differences in creativity. The model incorporates a complex of interacting elements of personality, cognitive abilities and non-cognitive traits or predispositions, aspects of social psychology as well as various antecedent conditions - suggesting that 'creativity is the complex product of a person's behavior in a given situation' (Woodman and Schoenfeldt,

1989:81). The 'situation', according to them, can be characterized in terms of the contextual and social influences that either facilitate or inhibit creative accomplishment.

Martindale (1989:214) noted that the 'rarity' of creative ability is due to the fact that creativity is only made possible by the *simultaneous presence* of a particular set of traits and circumstances - none of which is especially rare - but that may not, in general, be highly correlated with each other. According to Martindale, the set of traits and circumstances includes, on the cognitive level, an ability to think in some 'unusual way unavailable to most people' as well as 'specialized talents', whether learned or innate. On the motivational level, the set of traits includes high levels of self-confidence, ambition, perseverance and interest; otherwise, he concluded, they would be unable to bring their ideas to fruition. Finally, Martindale suggests, situational factors could foster or hinder creative accomplishment. He notes that one or more of these factors is often present in individuals, yet, he contended, all these factors must be present simultaneously if a person were to be creative.

Sternberg and Lubart (quoted in Starko, 1995:50) agree that 'high-level creative ability is relatively rare' since it depends on, as they phrased it, 'the complex interactions of various types of resources'. The required resources described by Sternberg and Lubart include a mental style that prefers to create its own rules, attack unstructured (rather than rigid or prefabricated) problems, specific personality characteristics such as tolerance of ambiguity, intrinsic motivation and moderate risk taking. Finally, like several other theorists (e.g. Amabile, 1983: 77; Petty, 1997:174), Sternberg and Lubart noted the importance of task-focused motivation in supporting creative activities.

Van Demark (1991:201) views cultural pressures as one of the most influential factors that affect creativity. He quotes Skinner as saying that a culture is not the behavior of us 'living in it', but the 'it' in which we live. The 'it' becomes the social and other forces which generate and sustain our behavior. These forces then affect our language, dress, and patterns of behavior, feelings, attitudes, interactions, value systems, religion, education, group norms, and almost all aspects of our lives (van Demark, 1991:200). Van Demark (1991:222) notes that being creative (deviating from the norm) amidst these established thinking patterns often means individuals must risk losing their cherished membership to a particular cultural order. The widespread cultural blocks to creativity, listed by van Demark, include various social taboos; the notion that fantasy is 'crazy'; that playfulness is for children only; that traditional is preferable to change; that creative problem solving is a serious business and humor is out of place; and finally that reason, logic, numbers, utility and practicality are preferred over feeling, intuition, qualitative judgments and pleasure (van Demark, 1991:200).

The inhibiting effects that the pressure to conform to cultural norms have on the creativity of students have been recognized by several researchers (Eiffert, 1999:18-19; de Bono, 2004; Marra, 1990:98). These authors frequently refer to the importance of teaching students that it is 'safe' to break away from established norms, to push the boundaries that inhibit creativity in order to be creative. Clegg and Birch (1999:45), in their discussion on strategies for creative thinking, referred to a technique called 'Challenging Assumptions', where students is asked to identify and subvert the underlying assumptions which were formed by cultural pressures and regulates their thinking. De Bono (quoted in Starko, 1995:77) referred to this process as 'escaping entrenchment'. Eiffert (1999:23) remarked that creative students are often required to think 'out-of-the-box' (the 'box' representing the fixed structure of established norms), yet, as Eiffert pointed out, the entire educational system in schools teach youngsters to be conformists. In the following statement, Eiffert explains how the typical school environment emphasizes conformist behavior above individuality:

As the days pass, children will be taught to line up, raise their hands, wait for permission and conform their activities to an acceptable norm. We will educate them to stay within the lines and compete for the gold stars and teachers' praise. "Make your grass green," the teacher will advise them. "Color it right," the teacher will admonish, as if there were a right way to see the world. "Look at how Bill is doing his picture, Bonnie." Conform to the group...

Sternberg and Lubart (quoted in Dacey and Lennon, 1998:72) noted that schooling generally inhibits creativity by imparting a low tolerance for failure. They remarked: 'one of the problems with the culture of schools is that students never learn how to take sensible risks, a skill that will be needed if they are going to do genuinely creative work'. Classically, education has been focused on teaching that emphasizes logic, analysis, argumentation and fact (Dacey and Lennon, 1998:71). Torrance (quoted in Dacey and Lennon, 1998:71) suggested that teachers often discourage creative thinking and 'steps into the unknown' because they want to avoid the risk of losing control. Control may take the form of teacher-chosen goals and activities, standardized routines and tests, or an inflexible curriculum that leaves no space for creativity (Dacey and Lennon, 1998:72). When the limiting effects of the typical school and cultural environments are taken into consideration, we may presume that a certain amount of 'damage' is already being done to the creative abilities of students who enroll for post-school education. As indicated by authors earlier in this discussion, deliberate fostering creativity may require the purposeful instruction in cognitive strategies to 'escape entrenchment' as de Bono phrased it (quoted in Starko, 1995:77).

In his discussion on the obstacles to creativity, Hallman (1971:220) summarized several research findings on the factors that generally inhibit creativity in education. According to this summary, any type of authoritarian environments inhibits creativity since it places emphasis on following directions, doing what one is told and on solving problems which have fixed and

predetermined answers. Furthermore, an overemphasis on rewards, such as grades, arouses defensive attitudes on the part of students and to that extent threatens inventiveness (Hallman, 1971:221). This finding was confirmed by Amabile (1983:109-111) during a series of studies that investigated the effects of grading and evaluation on creativity. Hallman's synopsis also indicated that most forms of evaluation, including certain types of feedback, can potentially affect risk taking and subsequently, creative behavior in students. His summary pointed out that an overemphasis on success drains off energies from creative processes and focuses them upon outcomes. Such overemphasis blocks creativeness because it has the tendency to direct attention away from growth and from continual improvement (Hallman, 1971:221).

These findings have profound implications for an educational context that endeavors to promote creativity. The processes of grading and evaluation, as well as the emphasis on success are often an integral part of most teaching environments, including those of graphic design. Indeed, several authors argue that evaluation procedures may reduce creative ability in students, often because of stress and insecurity caused by these processes (Jensen, 1995: 284; Houtz, 2003:205; Clegg and Birch, 1999:97; Amabile, 1983: 115). According to Vervalin (1971:76-81), feelings of insecurity could manifest in conforming behavior, lack of confidence, fear of failure, worry over personal esteem, fear of authority and feelings of dependency upon others. All of these behaviors, Vervalin argues, are detrimental to creative ability.

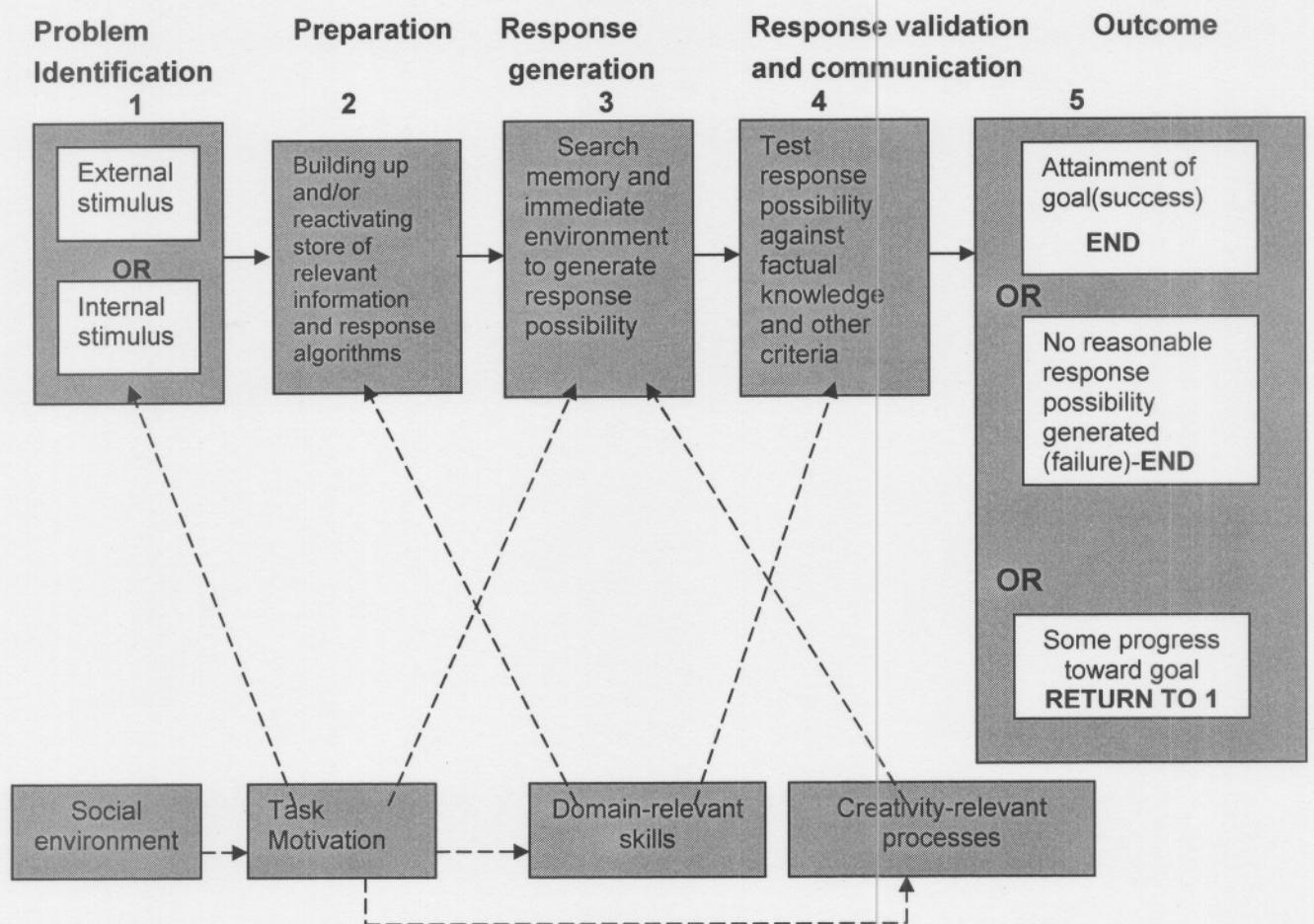
Amabile's influential *Componential model of creativity* (Figure 3) was one of the earliest creativity models to include cognitive, personality, motivational and social influences on the creative process and was the first to propose an explanation of how each of these factors might modify different steps in the creative process (Amabile, 1996:94). The model was also original in its particular emphasis on the function of motivation in the creative process and of social influences on creativity (Dacey and Lennon, 1998:80). As part of the model, Amabile (1983:65-77), suggested three main factors which she considered the most prominent prerequisites for creative productivity in practically any field. The three main factors are:

- domain-relevant skills which include an individual's total knowledge set, such as factual knowledge, historical knowledge, principles of the discipline, opinions, as well as specific field knowledge such as technical skills, perceptual skills and motor skills;
- creativity-relevant skills which involve the capability of understanding complexities; skill in breaking free of old, traditional and fixed sets or standards of performance; adept at generating novel ideas and making associations of seemingly unrelated ideas;

- task motivation which includes intense interest, giving undivided attention to the task; willingness to respond to intuition; feeling self-reliant; and being especially resistant to pressure and control of distracting outside factors.

In her model, Amabile (1996:93-98) indicated how these three factors could potentially affect the various steps in the creative process. Her model suggests a sequence for the creative process and proposes the primary influences that each of the major components will have at each stage. The dynamics between these influences are illustrated in the following diagram of Amabile's *Componential model of creativity* (Figure 3).

Figure 3: Diagram of Amabile's Componential model of creativity (Amabile, 1996:94).



Brown (1989:27) highlighted some shortcomings of Amabile's framework. He noted that although feedback is explicitly involved (Step 4 of the diagram), problem solving is presented as an essentially linear process in which failure or partial success leads to a return to Step 1. He argues that given close evaluation of shortcomings of a potential solution, however, one might well return to Step 2 or even 3 rather than Step 1. Furthermore, Brown argues, according to the diagram each of the three components influences only one or two of the steps directly, whereas they might as well affect virtually all. However, criticisms aside,

Brown recognizes that Amabile's research has led to an impressive body of information on the role of situational factors in the production of creative solutions. He referred to a range of experimental studies published by Amabile on the effect of social and contextual factors on creativity (Brown, 1989:28). Research studies published by Amabile and her colleagues include investigations on the effects of external constraints such as rewards on creativity, the effect of choice on creativity as well as the relationship between intrinsic motivation and creativity (Amabile and Hennessey, 1992:60, Starko, 1995:254; Houtz, 2003:204).

Amabile's *Componential model of creativity* illustrates, as several other authors referred to earlier, that creativity could potentially be influenced by a wide variety of cognitive and social-psychological factors. Not only do the three major components of her model, (domain-relevant skills, creativity-relevant skills and task motivation) interact with each other, but each results from interplay of several internal and external factors, indicated in Table 2 (Amabile, 1996:84).

Table 2: The three interacting components of Amabile's *Componential model of creativity* (Amabile, 1996:84).

<p><i>Domain-Relevant Skills</i></p> <p><u>Includes:</u></p> <ul style="list-style-type: none"> • Knowledge about the domain • Technical skills required • "Talent" <p><u>Depends on:</u></p> <ul style="list-style-type: none"> • Innate cognitive abilities • Innate perceptual and motor skills • Formal and informal education 	<p><i>Creativity-relevant skills</i></p> <p><u>Includes:</u></p> <ul style="list-style-type: none"> • Appropriate cognitive style • Implicit or Explicit knowledge of heuristics for generating novel ideas • Conducive work style <p><u>Depends on:</u></p> <ul style="list-style-type: none"> • Training • Experience in idea generation • Personality characteristics 	<p><i>Task motivation</i></p> <p><u>Includes:</u></p> <ul style="list-style-type: none"> • Attitudes toward the task • Perceptions of own motivation for undertaking the task <p><u>Depends on:</u></p> <ul style="list-style-type: none"> • Initial level of intrinsic motivation toward the task • Presence or absence of salient extrinsic constraints in the social environment • Individual ability to cognitively minimise extrinsic constraints
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In summation, it can be concluded that creative ability is indeed a vulnerable skill that could potentially be influenced by a wide variety of interactive factors. This section demonstrated through the views of various authors, theories and models that creative behavior is, as Woodman and Schoenfeldt (1989:89) phrased it, 'a complex person-situation interaction that is influenced by events of the past as well as salient aspects of the current situation'. This conclusion leads inevitably to the question: if the complexities involved in creative behavior

are considered, is it plausible to deliberately teach an individual to be creative? This problem is addressed in the next section.

2.3 Can creativity be taught?

An attempt to deliberately foster creativity may, in view of the complex network of variables involved in creative behavior, seem like an overwhelming and difficult task. Despite the apparent complexity of the matter, several researchers and educators (Eiffert, 1999:2; de Bono, 1993:6; Amabile, 1992:71; Houtz, 2003:156) support the notion that creative thinking can be deliberately developed through instruction and practice. They generally base this assumption on the results of a number of research programs (e.g. Parnes, 1971:270-275), experimental studies (e.g. Amabile, 1983:189-190) and training courses (e.g. de Bono, 2004; Parnes, 1992a:133-137) that have aimed to purposefully develop creativity in students. As James Marra (1990:32) remarked: 'quite simply, based on research findings, there can be no doubt that the tools, methods, frame of mind and temperament conducive to creativity can, in fact, be taught and learned successfully. To Treffinger (1993:14), it is not a question of asking *whether* it can be done, but of asking *how* to do it as effectively as possible. De Bono (1993:xii) regards creative thinking as a special type of information handling that should take its place alongside other teachable methods of handling information, such as mathematics, logical analysis and computer simulation. He concludes: 'we can train in creative thinking just as we can train in mathematics, cooking, or playing tennis' (de Bono, 1993:274).

This somewhat simplistic view of de Bono is probably due to the strong emphasis that his creativity training programs, based on 'lateral' thinking, places on the cognitive aspect of creative thinking. As we have seen in the previous section, creative ability depends on various factors such as motivational orientations, psychological states, personality, individual belief systems and more. Teaching creative skills unequivocally demands a more comprehensive approach than simply following lateral thinking techniques systematically. However, the importance of de Bono's cognitive approach to the deliberate development of creative skills must not be underestimated. As Runco (1997:95) pointed out, cognitive approaches to teaching creativity deserve scrutiny because they are the most visible and frequently cited evidence on the possibility of enhancing creative performance. Indeed, it has been recognized by several authors on creativity (e.g. Michalko, 1998a:98-286, Couger, 1995:119; Stein, 1974b:3-36) that the so-called 'divergent thinking tools' play a significant role in the purposeful stimulation of creative thinking.

An impressive spectrum of these creative thinking tools has been developed during the past decades. Many of them are listed on the Internet to aid creative thinking in people. For example, a website entitled, *Creativity and innovation: Mycoted* (2003) offers an alphabetical

list (Annexure D) of a large number of creativity tools that can be used to stimulate creative thinking. As the introduction to this website points out, 'these techniques are like tools in a workshop, with different tools for different parts of the creative process. It has a saw, spanner, hammer, knife and all sorts of other things in it, they are all very useful, but you have to pick the right tool (creativity technique) for each job'. For example, there are techniques for defining a problem, exploring attributes of a problem, generating alternatives, visual explorations, metaphors, analogies and evaluating or implementing ideas. These methods include the conscious shifting of focus, using provocative statements, connecting random elements and challenging assumptions. Examples of such techniques are:

- **Challenge tool:** this technique explores the reasons why we do things the way we do, challenging current thinking to uncover new possibilities (de Bono, 2004);
- **Random Entry:** this technique generates new ideas through a process of connecting unrelated words, objects or pictures (de Bono, 2004);
- **Synectics:** this technique utilizes different categories of metaphors and analogies to foster original ideas (Stein, 1974b:172-179);
- **Attribute Listing:** this technique identifies the major attributes or characteristics of a product object or idea and then modifies or combines them to stimulate new ideas and perspectives (Stein, 1974a:214).

Many of the divergent thinking techniques (discussed at length in Chapter 7 as part of the proposed Methodology) are based on de Bono's theory of creativity regarding the brain's tendency to function as a self-organizing system (de Bono, 1993:10-14). As it was pointed out in section 2.1, these techniques are believed to deliberately induce a shift in perception (habitual thinking patterns), stimulating the brain to move 'across from the main-track to the side-track' (de Bono, 1993:114). De Bono (2004) devised several creativity training programs aimed at the instruction of deliberate, systematic thinking processes. These have been proved to result in innovative thinking. Indeed, the value of these divergent thinking techniques to enhance creativity in various fields have been documented extensively (Feldhusen, 1993:40).

By the mid-1980's, American literature contained several summaries showing significant positive results of deliberate attempts to nurture creative abilities across various disciplines (Feldhusen, 1993:40). The largest single summary by Paul Torrance (in Rose and Lin, 1992:124) covers hundred and forty two individual research investigations into nurturing creative ability. The summary contains twenty two research studies evaluating the *Osborn-Parnes model for creative problem-solving*; and twenty of these indicated significant positive results. In 1985 Torrance reported that he had uncovered five hundred additional studies since the hundred and twenty two mentioned a decade before, with approximately the same

pattern of results. Rose and Lin (1992:124) used a statistical technique called meta-analysis to measure the degree of effectiveness of a wide spectrum of creativity training programs in 1984. All the approaches shared a common premise: that training, practice and encouragement in cognitive skills can increase the degree of creativity manifested by individuals. The report by Rose and Lin refers to data from a wide range of above mentioned research studies, so as to be able to reach a more reliable generalization. As many as 158 documents were included of which 76 were doctoral dissertations. The authors conclude the report on their comprehensive study with the following statement: 'through education and training the innate creative ability of individuals can be stimulated and nourished' (Rose and Lin, 1992:131).

The analysis by Rose and Lin included only studies that used the *Torrance tests of creative thinking* (TTCT) or their modified forms as the assessment instrument. This restriction helped to create a universal operating paradigm across studies on what constitutes creativity. The restriction also eliminated studies which may have used questionable measuring instruments. As pointed out in the previous section, the TTCT were supported by extensive research that confirmed their effectiveness as a measuring instrument for creativity (Rose and Lin, 1992:126). The various studies in the analysis were compared in terms of the following main components of creative performance (that typifies the Torrance tests):

- fluency: the ability to produce a large number of ideas with words or figures;
- flexibility: the ability to produce a variety of kinds of ideas, to shift from one approach to another, or to use a variety of strategies;
- originality: The ability to produce ideas away from the obvious, commonplace, banal or established;
- elaboration: the ability to develop, embroider, embellish, carry out or otherwise elaborate on ideas.

Although the merits of these findings cannot be ignored, the cognitive focus of these methods was criticized by psychologists such as Mansfield, Busse and Krepelka (in Vernon, 1989:105). They pointed out that the work of creative scientists and artists is totally unlike the cognitive skills tested in these studies. Their skepticism may be due to the fact, as de Bono (1993:xii) points out, that people are often skeptic about the potential of systemized and structured approaches to aid in the generation of innovative ideas, since creativity is traditionally associated with uninhibited free thinking. De Bono regards the association of creativity with unstructured thinking as entirely false and argues: 'many structures are liberating. A ladder is a liberating structure that allows you to get to places you would not otherwise have reached. Yet, you are free to choose where to go with your ladder'. Charles

Cave (1999) agrees that these thinking tools are useful for creative thinking when he remarked that 'lateral thinking tools are liberating devices that amplify our skills and enable us to do things that would be very difficult to do otherwise. A key is a formal tool that allows us to escape from a locked room'.

Commenting on the effectiveness of these techniques, de Bono (1993:7) points out that those students who are proficient in the use of these techniques should not have to wait for inspiration, but should use the tools deliberately and systematically whenever the need for a creative idea arises. He notes that the techniques are effective for those who experience a creative block, as well as for those who are highly creative. Starko (1995:190) agrees that divergent thinking techniques may effectively be used to enhance creativity, stating that 'rather than sitting and waiting for the muse to strike, students can use deliberate strategies to channel their thoughts in new directions'. Speculating about the mechanism that renders the techniques so effective, he suggests that the techniques mimic or stimulate the cognitive processes that underlie creativity. Using the techniques develops attitudes or habits of mind that facilitate creativity such as independence in judgment, willingness to explore multiple options and persistence beyond the first idea. In either case, familiarity with techniques designed to enhance creative thinking gives individuals a set of tools to use in their creative exploration.

Michalko (1998a:2) believes that creative thinking can be successfully trained through methods that characterize the way creative geniuses think. Michalko (1998a:4-8) indicated that by studying the notebooks, correspondence, conversations and ideas of the world's greatest creative thinkers, particular common thinking strategies that enabled geniuses to generate a variety of novel ideas, could be identified - creating a very clear picture of the nature of creativity. In his book, *Cracking creativity* (1998a) Michalko presents the thinking strategies of geniuses such as Disney, Michelangelo, Darwin, Edison, Mozart, Newton and others. Strategies include an ability to approach a problem from various different perspectives, dissatisfaction with one solution to a problem, consciously subverting habitual thinking patterns, constantly combining and recombining ideas and images into different combinations, tolerance of ambivalence between opposite or incompatible subjects and a capacity to perceive resemblances between two separate areas of existence via the use of metaphor (Michalko, 1998a:2-14). It is believed that if these mental skills (that apparently came naturally for the creative geniuses) are deliberately taught to individuals, their ability to arrive at novel solutions will be significantly enhanced (Michalko, 1998a:7). Incidentally, several of these abilities coincide with de Bono's lateral thinking skills and certain divergent thinking techniques such as Mind-mapping, 'Random Association' and 'Assumption smashing', that were mentioned earlier in this discussion. However, in an article

that investigates the backgrounds of two super-geniuses Einstein and Poincare, Miller (1998:51) remarked 'no amount of education or hot house atmosphere can grow Einsteins or Picassos or Mozarts...' He argues that even the very gifted scientist, composer or athlete practices their craft at great length daily and yet never reach the exalted heights of these super-gifted or super-genius people.

Practitioners of Neuro-Linguistic Programming also believe that creative thinking can be trained through a process of analyzing, decoding and 'modeling' the mental strategies used by creative geniuses (Dilts and Bonissone, 1993:63). Dilts, for example, studied Walt Disney's writings, observed films of him doing his work and interviewed people that worked with him. From this he extracted the *Disney creativity model*, indicating that Disney went through three distinct stages when he produced creative work (Dilts and Bonissone, 1993:132). Dilts called these stages the 'dreamer', the 'realist' and the 'critic'. Each of these three stages has a distinct physiology and thought patterns and can, according to Dilts, be consciously employed by individuals who want to improve their creative performance (Dilts and Bonissone, 1993:132-173).

Structured training courses in creative thinking have been offered for years at the *Creative education foundation* at the State University of New York in Buffalo, U.S.A., as well as at their annual conference, entitled the *Creative problem-solving institute* (Parnes, 1992b:2). At these institutions, the 'classic' *Osborn-Parnes model for creative problem-solving* (CPS) that was developed by Alex Osborn and refined by Sidney Parnes forms a central component of the training (Parnes, 1998). While most of the techniques referred to in the prior discussion focused on the training of particular cognitive *skills*, this model is focused on the training of a creative thinking *process* as a method to foster creativity (Parnes, 1992a:133). The method has a very extensive track record linked particularly with the *Center for studies in creativity* of the State University College at Buffalo, the *Buffalo creative problem-solving group* and with the *Center for creative learning* in Sarasota, Florida (Stein, 1974b:170). Over fifty years of academic research supports the effectiveness of the CPS model as a method to train creative thinking (Rose and Lin, 1992:131). The model has also served as the basis for several other models that refer to the various steps involved in the creative process, such as Amabile's *Componential model of creativity* discussed earlier.

The CPS model assists an individual or a group through six stages of creative thinking, with each phase comprising two modes of thinking - divergent and convergent thinking (Isaksen and Parnes, 1992:438). Stage 1 is called *Objective finding* and entails the search for issues, concerns, challenges and opportunities that need to be addressed when facing a creative problem. Stage 2 involves *Data finding*, the gathering of information about the problem; Stage 3, *Problem finding*, converts a broad statement of the problem into a specified

statement more suitable for idea finding; Stage 4, *Idea finding*, generates as many ideas as possible; Stage 5 generates and selects evaluation criteria and develops a set of short-listed ideas from the *Idea finding* phase; and finally at Stage 6, the idea is modified and implemented with the aid of checklists. This description provides only a simplified framework for what is in fact an intricate multi-dimensional process. Each of the convergent and divergent components of the various phases is aided by appropriate thinking strategies such as metaphorical thinking, delayed judgment, mind-mapping, forced relationships, brainstorming and checklists (Isaksen and Parnes, 1992:438-439). Thus, the CPS model is quite eclectic, including a wide variety of procedures and techniques not originally suggested by Osborn, but which have been developed by others and found useful for stimulating creativity (Stein, 1974b:170).

The CPS model, lateral thinking techniques, genius modeling and related procedures rely primarily on the control and manipulation of *cognitive* thought processes for the training of creative abilities. Indeed, as Brown (1989:3) points out, the cognitive approach has the most explicitly developed theoretical base, underlies most creativity tests and has generated the most empirical research. In his article, entitled *Fostering creativity in the classroom*, Cropley (1997:85) listed a number of well-known programs for fostering creativity, available as Annexure E. As indicated by this list, most programs give the greatest weight to the *cognitive* aspects of creativity (getting ideas, combining elements of information and the like). Cropley (1997:85) pointed out that only one program focuses on *aspirations and feelings* and another gives some weight to *attitudes* to problem solving (Cropley's *italic's*). He regarded the basic weakness of the techniques and programs on the list as that 'they are too narrow in their psychological content', noting that the creative process does not depend on a few specific skills that can be learned like tables in arithmetic (Cropley, 1997:88). Cropley (1997:89) emphasized that creativity arises not only from cognitive dimensions, but from a constellation of psychological characteristics including expertise (knowledge of a field), creativity-related skills and abilities, motivation and personal properties such as self-confidence.

In his *Creative learning model* (Annexure F) Treffinger (1992:431) aims to synthesize this multi-dimensionality of creative ability. His model describes three different levels of creative ability, with consideration of both affective and cognitive dimensions at each level. The purpose of the model was to serve as a framework for facilitators to encourage creativity in education over a broad spectrum of disciplines (not necessarily in art or design). However, in the same year, Isaksen (1992:430) provided evidence that many facilitators (at least sixty percent) who made use of Treffinger's model relied heavily on the fostering of mainly cognitive skills ('Level one abilities') that involve abilities such as fluency and flexibility, but failed to achieve the higher level abilities of the model which leads to the actual production of

a creative product. Isaksen ascribed these results to the fact that the lower-level cognitive methods and techniques are relatively easy to define, describe, plan and evaluate. Higher-level abilities in Treffinger's model, such as dealing with complex feelings and conflicts as well as the achievement of psychological safety, are according to Isaksen, more difficult to cultivate in a classroom situation (in Treffinger, *et al.*, 1992:94).

Although creativity involves cognition, Martindale (1989:211) argues that it involves a type of cognition that seems only to occur within a matrix of associated motivational, attitudinal and personal traits. The discussion of the various cognitive and social-psychological factors involved in creative behavior outlined earlier (in section 2.2) has also implied a comprehensive, holistic approach to the deliberate enhancement of creative behavior. A more comprehensive approach to the training of creative abilities is represented in Amabile's *Componential model for creativity* (Amabile, 1996:94). As it was pointed out in the previous discussion, her model was one of the earliest to include various cognitive, personal, motivational and social influences on the creative process (Dacey and Lennon, 1998:80).

According to Amabile (1992:72), strengthening each of the three components of the componential model of creativity – domain-relevant skills, creativity-relevant skills and task motivation - would enhance students' creativity in any domain, including artistic creativity. Amabile linked creativity-relevant skills to various cognitive skills related to divergent thinking, thus integrating cognitive and affective dimensions of creativity into her model. She explained that according to the model, methods that maintain or increase students' intrinsic motivation toward their work in general should lead to maintenance or an increase of their creativity and methods that maintain or increase students' intrinsic motivation toward a specific task should have similar effects on the task (Amabile, 1983:189). Amabile published several experimental studies (discussed in Chapter 3) to determine the relationship between intrinsic motivation and creativity. The results of her research indicated that factors that reduce intrinsic motivation, such as evaluation, the salience of extrinsic constraints, lack of autonomy and certain types of feedback reduce creativity in students (Starko, 1995:253).

Amabile's research indicated that social-psychological conditions conducive to creativity could contribute to measurable improvements in creative abilities. She regards the cultivation of high levels of intrinsic motivation in students as the key to the fostering of creativity in an educational context (Amabile, 1983:189). Through her research, she has indicated that a high level of intrinsic motivation could increase the probability that the creativity heuristics of risk-taking and playful exploration will be applied (Amabile, 1983:190). She believes that this type of motivation underlies individuals' willingness to experiment, try new ideas and explore new paths rather than seeking the quickest route to any kind of closure (in Starko, 1995:250).

Furthermore, Amabile (1983:191) suggested that high levels of intrinsic motivation can stimulate the development of domain-relevant skills and creativity-relevant skills, emphasizing the interdependency of the various cognitive and social-psychological factors that affect creativity.

Charles Cave (1999) highlights the interdependency of motivational and cognitive aspects of creativity, noting that without motivation cognitive strategies never get used. He believes that two different approaches to training creativity can be used: one can motivate and inspire students through appropriate methods to be creative first - and then teach them the cognitive techniques, or they can be taught how to use the techniques and when they find they can use the tools successfully to generate new ideas, it motivates them to become more creative (Cave, 1999).

The effectiveness of creativity training that combines cognitive *and* psychological aspects was demonstrated by a series of research projects done by the *Creative education foundation* at the University of Buffalo, under the direction of University psychologists and Sidney Parnes, co-developer of the CPS model (Parnes, 1971:270). The series of studies involved over 350 students who were enrolled for a course in creative thinking at the university (Parnes, 1971:271). The cognitive aspects of the course included training in the deferred judgment principle (artificially separating creative from judicial thinking at various stages of creative problem solving), practice in attribute listing (learning to look at problems from a variety of viewpoints), checklist procedures that teach students to analyze a problem from the standpoint of a number of questions and forcing relationships amongst unrelated elements in order to generate new ideas (Parnes, 1971:272).

Psychological dimensions to creativity were addressed in the course via demonstrations of the various perceptual, emotional and cultural blocks to creative thinking (Parnes, 1971:271). Under perceptual blocks were covered such matters as the difficulty in isolating problems, difficulty from narrowing the problem too much, inability to define or isolate attributes, failure to use all the senses in observing. Under cultural and emotional blocks were emphasized the effects of conformity, overemphasis on competition or cooperation, excessive faith in reason or logic, fear of mistakes and failure, low self-belief, perfectionism, negative outlooks and reliance on authority (Parnes, 1971:271).

An analysis of the results of the research indicated that the students who received this training showed substantial gains in the quantity and quality of novel ideas generated on two tests of idea quantity and quality repeated at the end of the course. Students in the control group showed relatively insignificant gains on these tests at the end of the semester (Parnes,

1971:273). It must be kept in mind that these cognitive approaches to creativity training and testing have been criticized by psychologists Mansfield, Busse and Krepelka who concluded that it is often simply creativity test performance rather than true creative thinking that is taught (Feldhusen, 1993:42). However, Parnes (1971:273) emphasized that the methods used for this study measure factors that are associated with 'practical' creative thinking, such as originality, sensitivity to problems, spontaneous flexibility and ideational fluency.

Results also indicated that the courses were found to be equally helpful to students of low and high initial creative ability and equally helpful to those with low and high intelligence levels (Parnes, 1971:273). Parnes noted that this finding is in line with Guilford's conclusion that although heredity may place limitations on the skills involved in creativity, these skills can be extended within those limitations through education. To measure the psychological components of the project, three tests were designed to assess self-confidence, self-reliance, persuasiveness, self-control and initiative. These characteristics were measured on the basis that these traits are generally associated with creative persons, according to a number of research studies. Results showed that trained subjects gained significantly in self-confidence, self-reliance, persuasiveness and initiative but less significantly in self-control (Parnes, 1971:273). Yet, according to Parnes (1971:274), the major findings of the research study proved that the training course significantly improved the students' level of creative ability.

Davis (1971:261) pointed to the inadequacy of an approach that aims to improve creative abilities by the identification and deliberate cultivation of personality traits associated with creativity. He remarked that while a trait approach to creativity is indeed informative, it fails to suggest precisely how creativity may be enhanced. According to Davis (1971:261), training to improve creativity should focus on three 'trainable' dimensions of creativity: creativity skills, creative thinking techniques and attitudes that are conducive to creativity. Creativity skills include abilities identified by Guilford and Torrance (in Rose and Lin, 1992:126) as part of the *Torrance tests of creative thinking* such as fluency, flexibility and originality. Creative thinking techniques recommended by Davis are similar to techniques promoted in training programs conducted by Parnes and de Bono such as 'checklisting', 'synectics' and 'attribute-listing'. The last 'trainable' ability noted by Davis and Scott (1971:272), namely 'attitude', includes attitudes such as open-mindedness, perseverance, postponed judgment of ideas and spontaneity. Davis's emphasis on the importance of attitudes can be linked to Jensen's remark that creativity is 'state-dependent' (Jensen, 1995:116). Jensen suggested that in order to foster creativity, a teachers 'priority job is managing students' states - to consciously read and elicit the optimal states for creativity'.

Vervalin (1971:77) regards the systematic identification and elimination (or 'read and elicit', as Jensen phrased it) of psychological blocks to creativity as an integral part of the deliberate maintenance of creativity in education. Simberg (1971:134) agrees, noting that an awareness of these blocks is the first step to their effective elimination. Even so, Simberg (1971:133) warns that 'there is no magic formula for removing the shackles that bind creative thinking'. The discussion on the influences on creativity (section 2.2) revealed a wide spectrum of interrelated variables that could potentially cause creative blocks in individuals, varying from cultural, personal and perceptual to emotional and psychological factors. The difficulty in dealing with creative blocks is highlighted by Vervalin (1971:78) when he mentions that without a great deal of hard work and close, introspective self-examination, any attempt to cope with these blocks is bound to be superficial and not permanent. He concludes that most of these barriers have a deep psychological base in the 'self' and only by fully understanding this base can we expect dramatic and lasting results. The elimination of creative blocks in students is clearly not an uncomplicated task, but according to these authors, purposefully addressing these blocks is an essential part of the deliberate maintenance of creative abilities in students.

In conclusion: suggestions on the deliberate improvement of creativity come from two sources, namely, direct training programs designed to increase creativity through cognitive interventions, as well as various studies, courses and proposed models that combine cognitive and social-psychological influences on creativity. In view of these sources outlined in this discussion, it seems clear that two main methodological processes underlie the deliberate development of creativity in education. The first process involves an approach with an emphasis on *structured training* with a focus on cognitive skills and the second approach involves a process of *maintenance and support* of a variety of social-psychological prerequisites needed to sustain creative ability.

The first approach includes proficiency in divergent thinking techniques that facilitate and stimulate the generation of new ideas (Michalko, 1998a:19-280), as well as certain meta-cognitive strategies that involve the active control of the various steps in the creative process (Parnes, 1992:438). These procedures are aimed at the deliberate inducement and cultivation of certain cognitive skills such as fluency, flexibility and originality that have been identified through research as important prerequisites for creative ability (Starko, 1995:194). The second approach involves a process where facilitators aim to support and sustain creativity in students through an awareness of social-psychological factors that could potentially affect creative abilities such as motivation, self-belief and a sense of autonomy (Cropley, 1997:89).

Considering the question posed in the beginning of this section - whether it is possible to teach creativity - it may be concluded, based on the results of the training programs and views expressed by authors in this discussion, that it is possible to train the cognitive skills, techniques and required mind-sets that are conducive to creativity through structured teaching methods. Furthermore, if educators are familiar with the social-psychological factors that influence students' creative abilities and endeavor to support optimal mental states for creativity in them, it seems plausible that creativity could be deliberately improved in graphic design students. The next section introduces the proposed Methodology that is intended to achieve this aim.

2.4 Introduction to the proposed Methodology

This section aims to briefly introduce the proposed Methodology for the fostering of creativity in graphic design education. The proposed Methodology rests on the premise that creativity may be intentionally improved if the main variables (prerequisites) that account for creative ability are strategically controlled. This process ultimately implies the effective, purposeful and systematic cultivation of the most important prerequisites for creativity, such as intrinsic motivation, self-belief and autonomy. The prerequisites addressed in the proposed Methodology provide a foundation for a range of interactive, interdependent strategies that aim to effectively induce and maintain creativity in graphic design students.

The set of proposed strategies is related to aspects that were addressed in the previous discussions, but for the purposes of the Methodology, variables that are closely related were grouped cohesively, resulting in six major strategies for the purposeful fostering of creativity. As indicated earlier, these strategies were selected on the basis that they are related to the prerequisites for creativity that are researched and documented *most frequently* in the literature on creativity - indicating their importance for the maintenance of creative ability. Furthermore, the strategies were selected on the basis that they are particularly relevant and applicable to the context of graphic design education.

The previous discussions indicated that the deliberate fostering of creativity should not rely exclusively on the development and maintenance of a single quality such as cognition or motivation. Rather, research on creativity concludes that if creative ability is to be purposefully improved, a range of personal, motivational, cognitive and social-psychological dimensions need to be addressed (Cropley, 1997:89). The prior discussion (section 2.3) on teaching creativity identified two focus areas that have been suggested by research, training programs, creativity models and theories for the deliberate fostering of creativity. They are firstly, the intentional training in certain cognitive techniques and thinking strategies and secondly the tactical support and maintenance of a range of social-psychological prerequisites for creativity. Therefore, the prerequisites for creativity which serve as the basis

for the proposed Methodology is divided into two main categories: firstly, prerequisites that relate to social-physiological (person-related) influences, comprising the cultivation and maintenance of intrinsic motivation, autonomy, low stress levels and self-belief in graphic design students. Secondly, cognitive (product-and process-related) prerequisites that involve the learning of a range of divergent thinking techniques for maximizing creativity as well as the deliberate management of the various phases in the creative process.

Although the strategies will be discussed at length in the following chapters, this section provides a brief introduction into each variable. The integration of these strategies into a coherent, plausible classroom program useful for developing creative potential in graphic design students will be provided in the conclusive chapter of this thesis. Divided into the two categories of (1) person-related and (2) product-and process-related dimensions, the strategies are now briefly introduced.

2.4.1 Person-related strategies

- **Strategy 1: Cultivate intrinsic motivation in students**

The identification of intrinsic motivation as an important prerequisite for creativity is based on the results of the multitude of experimental research studies conducted by Amabile (1983;1989;1996) and publications (Petty, 1997; Starko, 1995; Boggianno and Pittman, 1992) that indicate the prominent relationship between intrinsic motivation and creative ability. Intrinsic motivation, according to Amabile (in Dacey and Lennon, 1998:97), is marked by a person's active and enthusiastic engagement in an activity for its own sake and not for extrinsic reasons. For intrinsically motivated people, engaging in an activity is an end in itself (Boggianno and Pittman, 1992:11; Starko, 1995:116). Amabile indicated through her research that factors that reduce an individual's intrinsic motivation also reduce the person's creative ability (Dacey and Lennon, 1998:79). She published several studies that investigated the effects of variables such as rewards, choice, competition, surveillance and feedback on intrinsic motivation and creativity. Methods that aim to maintain high levels of intrinsic motivation and subsequently high levels of creativity in students include the purposeful emphasis on enjoyment of creative tasks, the reduction of salient evaluation procedures, the avoidance of competing environments and increase in positive feedback (Dacey and Lennon, 1998:79).

- **Strategy 2: Promote self-regulation and autonomy in students**

The importance of self-regulation, autonomy and individualism for creative ability has been pointed out by several authors on creativity (e.g. Starko, 1995:250; Amabile, 1983:75, Houtz,

2003:216; Pintrich and Schunk, 1996:277). Many of these authors regard the experience of a non-authoritarian, non-controlling, democratic environment that supports and respects the individual's autonomy as an essential prerequisite for creativity. They argue that aspects that reduce an individual's sense of independence and autonomy may reduce creative risk-taking, induce conformist behavior and dilapidate creative decision making. Strategies aimed at the support of autonomy and subsequently creativity, include certain styles of 'non-controlling' feedback (Starko, 1995:256; Pintrich and Schunk, 1996:218), self-evaluation (Houtz, 2003:215), the encouragement of personal goal setting (Pintrich and Schunk, 1996:176), the allowance of more choices in terms of task execution (Amabile, 1983:131) and the self-regulative use of strategies aimed at the fostering of creativity.

- **Strategy 3: Foster self-belief in students**

The importance of self-belief as a prerequisite for creativity is reflected in the following statement made by Eiffert (1999:4): 'nothing – education, birth order, cultural pressures, brain dominance and profession, even genetics – influences our creative potential more than self-belief'. The necessity to believe in one's own creative abilities in order to be creative is noted by numerous authors on creativity (Van Demark, 1991:76; Pintrich and Schunk, 1996:232; Marra, 1990:16; Petty, 1997:142). Many of these authors argue that it is the optimistic belief in an individual's creative potential that fuels the creative process with courage, determination and persistence (Starko, 1995:116; Eiffert, 1999:4). It is self-belief, concludes Zimmerman, (2001:267), that encourages a person to adopt the necessary mind-sets required for creativity, such as boldness, fearlessness, risk-taking as well as the strength to persist in the face of failure. Furthermore, Grové (1992:71) has explained that a positive belief in one's capabilities results in neurological changes in an individual's brain that support the successful execution of the task at hand. Strategies to enhance self-belief in students include the teaching of constructive self-talk techniques (Grovè, 1992:72-73), frequent confirmation of competence (Amabile, 1983:82) and the emphasizing of mistakes as opportunities for learning, rather than failure (Starko, 1995:250).

- **Strategy 4: Minimize stress levels**

While it has been postulated that moderate stress or a sense of urgency may in certain instances act as a stimulant to creativity (Eiffert, 1999:124; Van Demark, 1991:66) the majority of authors and studies on creativity conclude that stress is a major deterrent to creative ability (Jensen, 1995:24; Houtz, 203:30; Starko, 1995:256; Dacey and Lennon, 1998:120). Research (Grove, 1992:78; Jensen, 1995:23-24) has indicated that in stressful conditions, higher order brain activity (such as creativity) is moved from the cerebral cortex, which deals with complex thought, to what is known as the 'midbrain'. This part of the human brain triggers basic physiological processes at times of stress to ensure the survival of the

human species, disabling an individual to proceed with more complex thinking processes such as creative thinking (Groviè, 1992:82). Furthermore, it has been indicated that creative thinking is associated with 'alpha' brain waves that results from a relaxed, mental state (Eiffert, 1999:166).

Typical stressors that have been identified as possible inhibitors of creative ability in the educational context includes the imposition of deadlines (Houtz, 2003:205), fear of failure and criticism (Boggiano and Pittman, 1992:14; Petty, 1997:64), anxiety due to evaluation and grading (Jensen, 1995:286; Hallman, 1971:221; Pintrich and Schunk, 1996:308), threats to self-esteem (Amabile, 1983:115; Pintrich and Schunk, 1996:309) and an overemphasis on success (Hallman, 1971:221). Due to the performance orientated nature of graphic design, these stressors are often abundant in graphic design education. Strategies for the minimization of stress-related blocks to creativity include the purposeful de-emphasizing of evaluation procedures and competition (Amabile and Hennessey, 1992:71), focus on process and effort, rather than on performance (Starko, 1995:250), increase in supportive feedback (Starko, 1995:256; Pintrich and Schunk, 1996:337) and the use of music and humor to facilitate relaxed mental states (Jensen, 1995:95).

2.4.2 Product-and process-related strategies

- **Strategy 5: Teach divergent thinking techniques and principles**

As indicated in section 2.3, training in divergent thinking techniques has been widely recognized as one of the most fundamental components in the pursuit of deliberate stimulation of creativity (de Bono, 1993:55; Michalko, 1998a:6, Couger, 1995:119; Starko, 1995:193; Marra, 1990:137; Petty, 1997:76). These techniques are based on the assumption that creative thinking could be provoked and novel ideas generated if a particular thinking strategy is employed. Divergent thinking has been characterized by certain styles of thinking that formed part of Guilford's (1970:70) *Structure of intellect* model: *fluency* (the ability to produce a large number of ideas with words or figures), *flexibility* (the ability to produce a variety of kinds of ideas, to shift from one point of view or category to another, or to use a variety of creative approaches), *originality* (the ability to produce ideas away from the obvious, commonplace, banal or established) and *elaboration* (the ability to add detail to improve ideas, to develop, embroider, embellish, and elaborate on ideas). These cognitive skills closely resemble Amabile's description (1983:65-77) of 'creativity relevant skills' in her *Componential model for creativity* (discussed in section 2.2). Divergent thinking skills are developed in individuals by means of instruction, facilitation and training in a number of creative thinking techniques such as Mind-mapping (for fluency), 'Random Association', 'Synectics' and 'Attribute Listing' (for originality), 'Assumption smashing' (for flexibility) and

'Scamper' (for elaboration). These techniques are explained and applied to typical graphic design problems in Chapter 7 of the thesis.

- **Strategy 6: Manage the creative process**

Although there will always remain a certain mystery around the actual cognitive process that takes place in the human mind when creative activity occurs, several authors have attempted to analyze the phases of the creative process (Amabile, 1996:94, Petty, 1997:15-123, Parnes, 1992b:438-439). The ability to manage the creative process through the focused and deliberate execution of several cognitive steps that typify creative thought, has been regarded as a critical skill to acquire in creative work (Petty, 1997:13, Parnes, 1998). The well-known *Osborn-Parnes model for creative problem-solving* (the CPS model, discussed in section 2.3) is based on the assumption that creative ability can be trained via facilitation and instruction in the various steps of the creative process (Parnes, 1992a:136).

One of the earliest models of the creative process was proposed by Graham Wallas (1949). He divided the cognitive steps one passes through from the initial interest in a creative problem to the final manifestation of the creative product into five distinct phases: interest; preparation, incubation, illumination and verification. Wallas's model served as a basis for several other models of the creative process, including the CPS model. For the purposes of the proposed Methodology, emphasis will be placed on the model proposed by Geoffrey Petty (1997). The various phases in Petty's procedures show relationships with earlier models (such as Wallas's model and the Osborn-Parnes CPS model), but differ significantly from them on the basis that he adopts a more comprehensive approach that includes motivational and psychological mind-sets to the creative process.

It is significant to note that the person and process related dimensions reflected in the proposed strategies, correlates with a number of typical personality traits of creative people. Houtz (2003:99) summarized the characteristics that have been identified by several authors as follows: high energy, independence of judgment, autonomy, self-confidence, a firm sense of self as 'creative', assertive, independent and versatile. Runco (1997:45) offered the following list of personality traits of creative people: independence of attitude and social behavior, dominance, openness to stimuli, wide interests, self-acceptance, flexibility, unconcern for social norms, tolerance of ambiguity, rejection of external constraints, self-reliant, resourceful, enthusiastic, curious and demanding. These profiles correlate to a large extent with several of the prerequisites for creativity outlined in this discussion, pointing to the appropriateness of the strategies identified for the proposed Methodology.

Although each of the strategies is expected to affect creativity on its own, it is postulated that when all these strategies function interactively and inter-dependently, their effect on creativity should be significantly enhanced. For example, proficiency in the use of cognitive techniques that results in effective idea-generation, should have a positive effect on perceived self-efficiency and self-belief (Marra, 1990:109). More confidence in one's ability should then stimulate autonomy, courage and risk-taking. Pointing to the interactive stimulation between intrinsic motivation and cognitive skills, the inter-dependency of the variables involved in creative activity was effectively described by Amabile (1983:27) in the following statement:

The intrinsically motivated state, which I propose as the task motivation most conducive to creative performance, is typically characterized as one in which the individual adopts an attitude of intellectual playfulness and total absorption in the activity at hand. It is reasonable to suppose that this state would be most conducive to the set-breaking cognitive flexibility, the risk-taking that appears to be essential for high levels of creativity. Moreover, a sustained high level of intrinsic task motivation may make set-breaking and cognitive risk-taking more probable and more habitual, thereby increasing the permanent repertoire of creativity skills.

The strategies work interactively to induce and maintain creativity, with the ultimate aim to prevent the onset of creative blocks in graphic design students. However, if creative blocks are experienced, each of the prerequisites for creativity, represented in the strategies, could be assessed separately to identify one or more causes for the onset of a creative block. Therefore, the strategies form the basis for the purposeful and systematic identification and elimination of symptoms associated with creative blocks.

The proposed Methodology is a *theoretical construct* based on a synthesis of creativity models, theoretical frameworks, training programs and research studies documented in the literature on creativity. Certain aspects of the proposed Methodology such as intrinsic motivation, divergent thinking and process control are supported by significant bodies of research that indicate their importance for the fostering of creativity. Other aspects, such as the effects of stress and self-belief on creativity have been documented thoroughly in literature and are sometimes supported by research studies on related aspects, but lack experimental research to confirm theoretical postulations. This lack in experimental research on certain aspects of the proposed strategies points to a number of testatable hypotheses that are suggested by the proposed Methodology. Recommendations for such research studies are offered in the final chapter. Each variable of the proposed Methodology is addressed in the following chapters.

2.5 Conclusion

This chapter provided a prelude to the proposed Methodology through the formulation of an appropriate definition of creativity to be used throughout the thesis, a discussion on the

variables that influence creativity, a thorough examination of the question whether creativity can be taught and finally a brief introduction to the main components of the proposed Methodology. Section 2.1 indicated how each component of the proposed definition is related to the particular requirements of creative ability within the context of graphic design education. Section 2.2 demonstrated how creative ability is subject to various internal and external variables that could affect creative ability either positively or negatively. Section 2.3 concluded that creative ability could indeed be deliberately fostered through the intervention of firstly, structured training methods that focus on the acquisition of certain cognitive skills and secondly, methods that aim to support important social-psychological prerequisites for creativity. Finally, in section 2.4, the proposed Methodology was briefly outlined as a culmination of the theories presented in the prior discussions. Through the presentation of a brief motivation and discussion of each of the main strategies included in the proposed Methodology, an indication is given of the ways in which the strategies might contribute to the purposeful cultivation of creative abilities in graphic design students. These strategies are discussed in more detail in the following chapters to illustrate the potential impact that they may have on students' creativity as well as the theoretical underpinnings and research studies that support them.

PART 1

PERSON-RELATED STRATEGIES FOR THE FOSTERING OF CREATIVITY IN GRAPHIC DESIGN EDUCATION

CHAPTER 3

INTRINSIC MOTIVATION AND CREATIVITY

Introduction

This chapter examines the relationship between intrinsic motivation and creativity. The theoretical premise that underlies the chapter is based on Amabile's (1983) *Intrinsic motivation principle of creativity* that holds that when people are primarily motivated to do some creative activity by their own interest in and enjoyment of that activity, they will be more creative than when they are motivated by external pressures. The beneficial effects of an intrinsic mind-set on creative abilities are outlined. Various research studies that indicate the positive relationship between intrinsic motivation and creativity are referred to. Amabile's (1996:94) *Componential model of creativity* is discussed with reference to task motivation as a decisive prerequisite for creative ability. The effects of rewards on intrinsic motivation are highlighted. The discussion indicates that extrinsic constraints such as grading and evaluation procedures, which are essentially reward-systems, may reduce students' intrinsic motivation and subsequently, their creative ability. Reference is made to several research studies that support or contradict this hypothesis. Strategies to minimize the negative effects of extrinsic constraints on intrinsic motivation and creativity are discussed. The effects of various styles of feedback on intrinsic motivation as well as other extrinsic constraints such as competition or a lack of choice in the educational milieu are outlined. Finally, it is pointed out that the enjoyment of tasks should be emphasized in order to raise students' intrinsic motivation.

3.1 The effects of intrinsic motivation on creativity

Intrinsic motivation refers to the kind of motivation that drives individuals to engage in an activity *for its own sake* in the absence of external motivators (Pintrich and Schunk, 1996:257) (author's italic's). When the motivational impetus is intrinsic, engaging in an activity becomes an end in itself – the sheer enjoyment of performing a task is the reason for engaging in it (Boggianno and Pittman, 1992:11; Starko, 1995:116). In contrast, extrinsic motivation refers to motivation to engage in an activity as a *means* to an end. Individuals,

who are extrinsically motivated, work on tasks because they believe that their engagement in the task will result in desirable outcomes such as reward, teacher praise or avoidance of punishment (Pintrich and Schunk, 1996:258).

The relationship between creative ability and intrinsic motivation has been highlighted by an influential body of research mainly conducted by Theresa Amabile and her colleagues (1983; 1989; 1996). The results of her experimental research program led to what she called the *Intrinsic motivation principle of creativity* (Amabile and Hennessey, 1992:55). She described the principle as follows: 'when people are primarily motivated to do some creative activity by their own interest in and enjoyment of that activity, they shall be more creative than when they are primarily motivated by external pressures' (in Dacey and Lennon, 1998:79). Therefore, this principle suggests that creative ability in graphic design students may be enhanced if their intrinsic motivation for tasks is maintained.

Several reasons have been given for the fact that creative abilities are supported by intrinsic motivation. One reason, according to Amabile (1983:27), is because the intrinsically motivated state is typically characterized as one in which the individual adopts an attitude of intellectual playfulness and total absorption in the activity at hand. She believes that intrinsic motivation tends to be most supportive of set-breaking cognitive flexibility and the risk-taking that appears to be essential for high levels of creativity. Deci and Ryan (in Houtz, 2003:101) has also pointed out that intrinsically motivated behavior is associated with creative mind-sets such as flexibility and spontaneity, whereas extrinsically motivated actions are characterized by pressure or tension and may result in low self-esteem or anxiety. Petty (1997:176) notes that when an individual is driven by pure intrinsic motivation he or she enjoys the creative work for its own sake and tends to maximize both the effort and the time spent on the task. He notes that in this state, 'one's level of concentration will be high and one will be indulgent of any difficulty, seeing it as a fascinating challenge rather than a frustrating impediment to one's hopes'. Lepper and Greene (quoted in Amabile and Hennessey, 1992:56) pointed out that the intrinsically motivated person, in contrast to the extrinsically motivated person, would feel freer to take creative risks because those risks carry no liabilities – except for self-imposed ones. These observations highlight a number of important mind-sets, such as playfulness, flexibility and spontaneity that are usually promoted in graphic design education.

Mc Graw (quoted in Deci and Ryan, 1992:70) proposed that extrinsic motivation improved performance on algorithmic tasks (those with clear and straightforward paths to solution) but undermined performance on heuristic tasks (those for which some search is required, such as creative work). Using this premise, Deci and Ryan (1992:70) developed a metaphor for

the mechanism that causes intrinsic motivation to be conducive to creativity. They compared a creative task to a maze with only one entrance and one clear, straight path leading to an exit. The direct path is an algorithm for this task – a solution that is familiar and well practiced. It leads to an exit, which is an acceptable solution to the problem. If one were extrinsically motivated, one's motivation would come primarily from something outside the maze, such as a promised reward or external evaluation. Under these circumstances, the most reasonable thing to do would be to follow the familiar algorithm. The usual exit would be reached with a minimum amount of effort; the task would be satisfactorily completed, the extrinsic goal would be achieved (Deci and Ryan, 1992:70-71). Although the solution is acceptable, Deci and Ryan points out that the solution still remains uncreative - it is 'not novel and it engenders no insight'.

On the other hand, according to Deci and Ryan's metaphor, if one were intrinsically motivated, one would enjoy being in the maze. In this instance, one would be motivated to find other more creative ways to exit the maze. These creative solutions cannot be discovered by following the algorithmic pathway. They can only be discovered by deviating from the path, exploring the maze and developing heuristic approaches to the task. In order to arrive at a truly creative solution, the exploration must be flexible enough to permit retracing steps and reformulating plans. This dedicated behavior is likely to happen if one were intrinsically motivated. In this instance, one would find the exploration and risk-taking that is required for the task to be, in itself, rewarding (Deci and Ryan, 1992:70-71). This metaphor illustrates the ideal mind-set for a graphic design student aiming at optimum levels of creativity – a mind-set where creativity flourishes due to an intrinsic interest in the task itself and where the process of seeking creative solutions is stimulated by one's absorption and enjoyment of the task.

Confirming the appropriateness of this metaphor, Amabile (1983:122) refers to an experiment conducted by Shapira that examined the effect of extrinsic motivators such as rewards on heuristic tasks. In this study, the tasks involved solving puzzles. Shapira found that subjects expecting payment for successfully completing the puzzles (thus being extrinsically motivated) chose relatively easy puzzles to work on, whereas subjects expecting no payment chose much more challenging ones (Amabile, 1983:122; Deci and Ryan, 1992:15). Similarly, in another experiment, Pittman and his colleagues found that non-rewarded subjects showed a strong subsequent preference for complex versions of a game, whereas rewarded (extrinsically motivated) subjects chose simpler versions (in Amabile, 1983:122). This effect was obtained even though the groups performed equally well on moderately complex versions of the game.

In a study in which Amabile (in Houtz, 2003:207) attempted to examine the direct effects of intrinsic motivation on creativity, individuals who identified themselves as actively involved in creative writing were asked to write haiku-style poems. Before writing the poems, they were required to rank-order, according to personal importance, seven reasons for writing. Some of them were asked to rank seven intrinsic reasons, such as 'you feel relaxed when writing' and 'you achieve new insights through writing'. Others were asked to rank seven extrinsic reasons for writing, such as 'you enjoy public recognition of your work' and 'you have heard of cases where one best selling novel or collection of poems has made the author financially secure'. The results of the study indicated that those who were asked to consider extrinsic reasons for writing wrote poems that were rated as significantly less creative than poems written by the other subjects. According to Amabile, this finding suggests that simply thinking of external constraints can undermine intrinsic motivation and subsequently creativity. Although these studies cannot be related directly to the context of graphic design education, they do seem to warn that students who are focused on extrinsic motives for their creative work may experience a reduction in their creative abilities.

The previous chapter indicated that apart from 'domain-relevant' and 'creativity-relevant' skills in Amabile's *Componential model of creativity* (1983:65-77), the concept of 'task motivation' is a central component of the model. Dacey and Lennon (1998:76) suggested that within Amabile's componential formulation, task motivation includes two elements: firstly, the individual's 'baseline attitude' towards the task and secondly, the individual's perceptions of his or her reasons for undertaking the task in a given instance. A baseline attitude towards the task is formed, quite simply, when the individual performs a cognitive assessment of the task and the degree to which it matches his existing preferences and interests. On the other hand, perceptions of one's motivation for undertaking the task in a given instance could be either intrinsic or extrinsic (or a combination thereof) and depends largely upon external social and environmental factors. These factors specifically refer to the presence or absence of salient extrinsic constraints in the social environment such as deadlines, rewards, competition and evaluation (Hennessey, 2003:259; Dacey and Lennon, 1998:77). Task motivation can be seen in this context as the most important determinant of the difference between what a person *can do* and what a person *will do*. The former is determined by the level of domain-relevant and creativity-relevant skills as proposed by Amabile (1983:65), while the latter is determined by these in conjunction with the level of intrinsic motivation for the task (Dacey and Lennon, 1998:77).

Amabile (1992:71) postulates that according to her model, methods that maintain or increase an individual's intrinsic motivation towards a task should lead to the maintenance or increase of their creativity in the task. She points out that, in one respect, the task-motivation

component of her componential model may be the most important since it appears to be most subject to immediate influence and therefore more readily altered by practical interventions (Amabile and Hennessey, 1992:57). In her research studies, she set out to match subjects on domain-relevant and creativity-relevant skills in order to examine the role of individual differences in the third component of her model - task motivation - more closely. Her main hypothesis was that the extrinsic constraints undermining intrinsic motivation in individuals would also undermine their creativity. She suggested that even talented people who had produced very creative work in the past would not work at their highest possible levels of creativity if they were extrinsically motivated toward a particular task.

In sum, these observations (and studies) seem to indicate a strong link between intrinsic motivation and creative ability. They suggest that if we aim to deliberately foster creativity in graphic design education, methods should be devised that sustain intrinsic motivation in students. As demonstrated later in this chapter, this may imply a strategic approach to the minimization of extrinsic constraints in the educational environment. Amabile (1992:60) has identified several extrinsic constraints that could possibly influence the level of intrinsic motivation in individuals. Of all these influences, however, the effects of rewards on intrinsic motivation and creativity have probably been researched the most extensively. The following discussion reviews the research studies and theories documented in literature on the effects that incentives such as rewards might have on creativity and intrinsic motivation.

3.2. The effects of rewards on creativity and intrinsic motivation

A number of authors on creativity have suggested that when rewards are expected for creative tasks, these may cause a shift from intrinsic to extrinsic motivation and subsequently results in a reduction of creative ability in individuals (Dacey and Lennon, 1998:79; Jensen, 1995:234-236; Amabile, 1992:60). Amabile and her colleagues published more than two dozen studies over nearly 25 years rendering the same results, namely that in many areas, reward systems lower the quality of the creative work produced (Hennessey, 2003:235, Jensen, 1995:234). Although none of these studies addressed creativity in the context of graphic design education directly, their findings seem significant for deliberately fostering creativity in an educational context. As Jensen (1995:242) points out, 'in most educational contexts, the entire system of marking and grading is a reward and punishment system'. Indeed, the tradition of assessment and grading ('rewarding') has been an integral part of most forms of education, including that of graphic design. Traditionally, the system of evaluation and grading was seen to motivate students (Jensen, 1995:286). However, it appears that although rewards motivate behavior, the motivation induced is extrinsic and therefore not conducive to creativity (Deci and Ryan, 1992:15).

The most frequently demonstrated consequence of a person's shift from an intrinsic to an extrinsic motivational orientation caused by the expectation of rewards is a phenomenon referred to as the *over-justification* effect (Deci and Ryan, 1992:39). This effect is said to occur when subjects are rewarded for engaging in activities that are initially intrinsically motivated. As pointed out earlier, when individuals are motivated intrinsically, the enjoyment experienced through the task engagement is perceived as a reward in itself. When these individuals are offered a reward over and above the 'intrinsic reward' of enjoyment, the reward is said to provide *more* than adequate justification for their participation in the task, resulting in an 'over-justification' of their engagement in the task (Deci and Ryan, 1992:39).

Studies have indicated that in these instances, compared to subjects who were not rewarded, individuals tend to lose interest in the tasks when they are presented with a free choice to engage in the activity (Pintrich and Schunk, 1996:275). Engaging in an activity when presented with a free choice to do the so is regarded as an indication of intrinsic motivation (Houtz, 2003:202). It seems that once an individual associates an activity with an extrinsic orientation, he or she is less likely to choose the activity in a free-choice period because the reason for engaging in the activity (the contingent reward) is no longer applicable (Deci and Ryan, 1992:39). Therefore, when people work on a task to obtain a reward, they are likely to perceive the reasons for their engagement in the task as extrinsically motivated (Pintrich and Schunk, 1996:275). Amabile (1992:60) pointed out that this extrinsically motivated state can cause a narrow focus on the creative task, turning the goal into one of completing the task as quickly as possible and a general avoidance to take risks. She notes that rewarded individuals tend to be controlled by the 'payoff' and gradually come to lose whatever interest in the creative task they may have had.

This point was illustrated in a study by Lepper, Greene and Nisbett (in Amabile and Hennessey, 1992:58) in which they examined the effect of rewards on children's artistic creativity. They found that subjects who initially displayed a high level of intrinsic interest in drawing with 'magic markers' lost interest in drawing after working for an expected 'Good Player Award'. Compared with a group of children who was given an unexpected reward after drawing and a control group that received no reward, the subjects who played with the magic markers to receive a reward spent significantly less time using the markers during free-play periods. This decrement in interest persisted for at least a week beyond the initial experimental session. Furthermore, the globally assessed creative quality of the drawings made by children expecting a reward was lower than that of the drawings made by the two control groups (Amabile and Hennessey, 1992:59; Houtz, 2003:204). Discussing the results of the study, Starko (1995:253) pointed out that it was as if the participants could conceive of no other reason to draw once they had drawn for a reward. He argues that rewarding

individuals for the tasks that are generally interesting and motivating in themselves is to imply to them that the tasks are dull and not worth exploring on their own (Starko, 1995:257).

Amabile and Hennessey (1992:60) published several research studies that indicated that rewards, when promised before a creative effort, diminish the creative quality of the activity itself. In one study, Israeli high school students who either had or had not been promised a reward were given two open-ended creativity tasks. These tasks required subjects to list as many titles as possible for a literary paragraph and to use as many words as possible from a fifty-word list in writing a story. Originality ratings of these products were made by two independent judges, who displayed good inter-judge reliability. These ratings revealed a clear and statistically significant superiority in the creative thinking of non-rewarded subjects. The researchers used their 'consensual assessment technique' to assess the level of creativity reflected in the tasks. This technique is based on the assumption that a panel of independent expert raters, persons who have not had the opportunity to talk with one another or with the researcher about hallmarks of product creativity, are best able to make such judgments (Hennessey, 2003:257).

In another study, children were asked to tell stories from a picture book (Amabile, *et al.*, 1986:14). One group was told they would be rewarded for this activity by having the opportunity to take a picture with a Polaroid camera. If they agreed to tell the story, they were allowed to take the pictures first, than complete the story task. Other children also took pictures and told stories, but were simply presented with the activities as two unrelated things to do. Students who worked in the non-reward condition produced stories judged to be significantly more creative than those who told their stories for a reward. The findings of both these studies suggest that the extrinsic focus that was caused by the rewards reduced the subjects' creative abilities (Houtz, 2003:207; Amabile and Hennessey, 1992:60). Since grading can be viewed as a 'reward system' in education (Jensen, 1995:242), the findings of these studies suggest that evaluation procedures may cause an extrinsic focus in graphic design students, impacting negatively on their creative ability.

Houtz (2003:203) noted that the underlying theme in much of the intrinsic motivation literature is a counterpoint to traditional learning theory. According to Houtz, learning theory proposed that rewards enhance behavior – when a child is given a gold star for spelling a word correctly it is presumed that the child will be trained to master the task. However, in recent years, Houtz argues, researchers have provided evidence that this relation is not guaranteed; especially when the behavior is intrinsically motivated at the start. Rewards were traditionally believed to be motivational because students expect that behaving in a given fashion will be rewarded (Pintrich and Schunk, 1996:275). But as Pintrich and Schunk

pointed out, when students behave in a desired fashion that they believe will result in reward attainment, it may reduce their sense of freedom and autonomy needed for creativity. Jensen (1995:235) agrees with this observation. Focusing on a brain-based approach, he studied the conditions in which creative behavior are most likely to occur. In accord with Pintrich and Schunks' observation, Jensen (1995:235) concluded:

A reward system prevents the establishment of intrinsic motivation because there's rarely an incentive to be creative - only to do the asked-for behavior. Creativity is rarely part of any reward system - in fact, the two are usually at far ends of the scale. You get either intrinsically motivated creative thinking or extrinsically motivated repetitive, safe, predictable behaviors.

Petty (1997:179) has also warned that if students are focused on extrinsic motives such as grades they may be 'mindful of whom they must impress, of the acceptability of their work to the mind of the reward giver'. They shall tend to take fewer risks, explore less and trust their own ideas less. Furthermore, according to Petty, these students may economize their efforts, adopting a 'good enough' approach and do only what is necessary. Eiffert (1999:26) pointed out that traditionally, the educational system taught students to focus more on the grade or outcome of their educational experience than the experience itself. He remarked 'students were not in school to learn; they were in school to graduate'. Indeed, this emphasis on grades or outcomes, instead of on the learning experience, is often part of graphic design education.

Another aspect of a grading system that may affect motivation is the indication of failure or success suggested by the mark (or the 'reward') given. Seligman and his colleagues (in Deci and Ryan, 1992:14) conducted numerous studies of failure and inefficacy. Their theory suggests that when people fail in their attempts to achieve desired outcomes, they tend to lose motivation and act helpless. In one study subjects who performed an activity under conditions of unattainable outcomes lost the motivation to perform effectively to such an extent that in subsequent situations in which outcomes were attainable, they were less affective in achieving those outcomes. The experience with failure left them de-motivated. Therefore, it seems that if an evaluative report indicates failure at a creative task, motivation tends to be reduced. Fortunately, the opposite effect is likely to be achieved through a positive report.

Although the damaging effects of rewards and evaluations on creative ability have been established by several studies, the issue has become controversial in recent years. Eisenberger and Shanock (2003:121) note that 'three decades of research have failed to produce general agreement concerning the effects of reward on creativity'. They believe that the problem stems primarily from the clash between romantic (such as Amabile's

perspective) and behaviorist worldviews concerning basic human nature. According to them isolation of these research camps has produced narrow perspectives and failures to correct methodological flaws. They acknowledge that rewards being viewed as an extrinsic constraint is consistent with a large body of empirical research findings but question whether the findings could be generalized. They point out that careers of outstanding scientists and mathematicians suggest that anticipated rewards often increase creativity. Furthermore, using a behaviorist and information-processing perspective, research conducted by Stokes (in Eisenberger and Shanock, 2003:122) found that novel performance was sometimes increased by reward.

A few studies published by Eisenberger *et al.* (1999:1026-1040) suggest that reward increases perceived self-determination and perceived competence, thereby increasing intrinsic motivation. Some of these studies were carried out with college students indicating that a reward contingency requiring a high level of performance increased perceived self-determination and perceived competence, both of which enhanced intrinsic task interest. These findings are contrary to the widely accepted *Cognitive evaluation theory* developed by Deci and Ryan (1992:23). This theory holds that rewards are usually viewed as an attempt to control a person's behavior and subsequently tend to decrease a person's sense of self-determination and intrinsic motivation. Eisenberger and Shanock (2003:131) point out that many studies have shown that the *nonspecific* promise of reward frequently reduces creative performance. They argue, however, that because people are more often rewarded for conventional than creative performance in everyday life, the nonspecific promise of reward may convey the necessity of conventional performance for reward. According to them, this construal of the reward contingency as requiring only conventional performance does increase conventional performance, often at a cost to creativity. Based on research conducted by Eisenberger, Armeli and Pretz (1998:704-714) they suggest that the motivation for creativity can be readily enhanced by establishing an expectancy that *creativity depends on reward*.

Their study was carried out with fifth and sixth graders. The children were asked to make drawings out of printed circles, using each circle as a major part of a picture. Some children were specifically asked to produce novel drawings; others were given nonspecific instructions concerning the nature of the pictures they were to draw. Half the children within each of these conditions were promised a monetary reward and the remainder was given no such promise. The promise of reward increased the novelty of children asked to produce novel drawings and did not influence the novelty of children given nonspecific instructions about the task. Thus, Eisenberger and colleagues concluded that instructions that defined the task as creative rendered the promise of reward an effective motivator of creativity. To

assess the level of creativity, they used, what they regarded as 'an objective measure of novelty', namely, the statistical infrequency of an experimental participant's drawings in the total population of drawings produced by all the participants. According to Eisenberger (2003:132) the study indicated that reward offered *explicitly for novel performance* increased the key component of creativity, namely novelty.

Several studies published by Eisenberger and colleagues (e.g. 1997; 2001) indicated that the effects of reward on creativity depend on the recipient's understanding of the task. According to Eisenberger, reward evidently increases creativity whenever an individual expects that *creativity* will produce reward. The expectation that creativity will be rewarded causes individuals to define the task as requiring creativity, to become immersed in it and to search for novel ways of carrying it out (Eisenberger, 2003:135). These research findings may be related to the context of graphic design education, since graphic design tasks are usually defined as requiring creativity. Traditionally students in graphic design education are rewarded with good marks when their work achieves the expected level of creativity or novelty. In view of these research results, students may find a grading system that rewards work on the basis of the level of creativity it reflects, as motivational. However, it may be argued that this type of motivation is extrinsic and not intrinsic and may therefore not be as beneficial for creative ability as Eisenberger suggests.

In response to the Eisenberger and colleagues' research, Hennessey and Amabile (1998:674) challenged the ecological validity of the statistical infrequency of responses as a measure of creativity. They maintained that their method of assessment, the subjective evaluation of creativity by judges familiar with the domain of the creative product 'is much closer to real-world judgment of creativity in the classroom, the corporation, or the art gallery'. Despite the evidence gathered by Eisenberger and colleagues, Hennessey (2003:238) still holds that 'hundreds of published investigations reveal that the promise of a reward made contingent on task engagement serves to undermine intrinsic task motivation and qualitative aspects of performance, including creativity'. She states that this effect is 'so robust' that it has been found to occur across the entire lifespan, with pre-schoolers and seasoned professionals, all experiencing the same negative consequences.

However, Hennessey (2003:259) does acknowledge that most researchers taking a social-psychological approach to the study of creativity have come to appreciate the many complexities of both motivational orientation and the reward process. She admits that researchers have recently come to supplement their original 'hydraulic conceptualization' with an additive model that recognizes that under *certain specific conditions*, the expectation of reward can sometimes increase levels of extrinsic motivation without having any negative impact on intrinsic motivation or performance. Indeed, Hennessey notes that some types of

extrinsic motivation can actually enhance creativity of performance. She contends that under certain specific circumstances, the informational value implicit in performance-contingent rewards has been shown to *increase* feelings of self-efficacy, intrinsic task interest and qualitative aspects of performance.

Collins and Amabile (1999:304) also took the broader view that reward can sometimes increase creativity, although they asserted that decremental effects are more common. They conceded that adults' creative performance may be encouraged if 'rewards provide information or enable the person to better complete the task'. In her 1996 update of her 1983 publication, Amabile (1996:202) remarked that although her research support the basic tenets of the intrinsic motivation principle, certain forms of extrinsic motivation may have no impact or even have a positive effect on creativity. In an earlier publication, Amabile (1983:95) noted that there are two other conditions under which extrinsic constraints would not be expected to be detrimental. First, the individual may be less dependent than most people on social approval and tangible rewards and therefore be able to psychologically reduce the salience of the extrinsic goal while engaging in a creative task. Second, the individual's intrinsic motivation may be so high that the extrinsic motivation is not primary (Amabile, 1983:96).

Of more direct consequence to the context of graphic design education, is Hennessey's (2003:259) observation that research conducted over the past years on the impact of evaluation on creativity indicated that 'the expectation that one's work will be judged may well be the most deleterious extrinsic constraint of all'. According to her, this may be due to the fact that situations of evaluation often combine aspects of the other 'killers' of motivation and creativity such as competition, surveillance or time limits. However, she points out that as is the case with the reward literature, studies of the impact of expected evaluation have become increasingly finely tuned over the years. Researchers now have a much more sophisticated understanding of evaluation effects and are quick to point out that not all evaluative contingencies can be expected to have the same deleterious impact. Theorists now understand that the type of task presented to study participants can, in large part, drive their experimental results and recent studies reveal that under certain specific conditions, both the delivery of a competence-affirming evaluation and the expectation of an impending evaluation can sometimes increase levels of extrinsic motivation without having any negative impact on intrinsic motivation or performance. In fact, some forms of evaluation expectation can actually enhance creativity of performance (Hennessey, 2003:260). Some of the complex effects of expected evaluation are discussed in publications by Harackiewicz *et al.*, (1991:1015-1029) and Jussim *et al.* (1992:402-421).

Starko (1995:281) pointed out that traditional evaluation is in conflict with many creativity research findings on at least two fronts. First, traditional testing and grading epitomizes the factors of evaluation, reward and competition that have often been found to undermine both the intrinsic motivation for creative activities and the quality of creative products. Second, the kinds of products associated with creativity – solving problems and expressing original ideas – do not lend themselves to single-letter grades or multiple-choice tests. Hennessey (2003:264) also pointed out that traditional classrooms 'have somehow managed to structure educational environments in such a way that intrinsic motivation and creativity are bound to suffer, if not be completely destroyed'. She notes that those factors that are regarded as detrimental to intrinsic motivation such as expected reward, expected evaluation, surveillance, time limits and competition abound in traditional educational settings.

Asking how these conditions could be addressed, Hennessey notes that one solution would be for educators to eliminate both task-contingent rewards and controlling systems of evaluation and situations of competition from the classroom. However, she cautions that 'old habits die hard' and it is questionable whether these fundamental changes in the way that students are taught could be successfully mandated. Rather than trying to transform classroom practice, a second option would be to change the way students react to situations of extrinsic constraints. Starko (1995:255) also suggests that the key when considering the findings of Amabile and colleagues' research is to refrain from trying to determine how to eliminate factors such as evaluation from educational contexts, but rather to 'think carefully about the ways these factors operate in classes and attempt to minimize their detrimental effects on students' intrinsic motivation and creativity'. Houtz (2003:212) also pointed out that educators should rather boost intrinsic motivation and creativity by emphasizing working for enjoyment *despite* the rules that govern the process, rather than by *removing* all rules that govern the process (Houtz italic's).

To conclude: despite the controversy over the impact of rewards and evaluation on creative ability, the positive relationship between intrinsic motivation and creative ability seems well founded. Indeed, Hennessey (2003:255) asserts that 'social-psychologists seeking to better understand the psychosocial factors that promote creativity have now gathered so much unequivocal research evidence that this proposition has been elevated to the status of an undisputed principle'. Thus, establishing methods that foster intrinsic motivation in graphic design students may prove to enhance their creative abilities. Issues surrounding the implementation or elimination of rewards or evaluation systems in graphic design education seem more problematic. Conflicting research findings on these issues suggest that educators should take cognizance of the potential detrimental effects of reward-and evaluation procedures on students' creative abilities, without eliminating them all together. Thus, in view

of these complexities, it seems that educators who are inclined to foster intrinsic motivation in students with the ultimate aim to enhance their creative ability needs to be aware of the *potential* detrimental effects of extrinsic constraints and seek strategies to minimize their negative effects on intrinsic motivation. Several authors (Jensen, 1995:288; Amabile and Hennessey, 1992:71; Deci and Ryan, 1992:150) proposed suggestions to minimize the potential damaging effects that extrinsic constraints may have on the creativity of students. They are discussed in the next section.

3.3 Strategies to minimize the negative effects of extrinsic constraints on intrinsic motivation and creativity

In a series of studies Amabile and Hennessey (1992:71) endeavored to 'immunize' children against the effects of extrinsic constraints on their creativity by bolstering the salience of intrinsic motivational factors. The findings of this research suggest that emphasizing intrinsic motives can shield one from the negative influences of extrinsic constraints. In sum, the studies suggest that an intrinsically motivated mind-set can be achieved through specially devised training programs. The subjects in the above mentioned study participated in two group-training sessions on two consecutive days. During each session, groups of two or three children (randomly assigned to condition and group) watched a videotape and discussed the contents of the videotape with a researcher. In the crucial intrinsic-motivation training, the videotapes depicted two youngsters talking with an adult about various aspects of their schoolwork. The scripts for these tapes were written so that the children on the tape would serve as models of highly intrinsically motivated individuals (Amabile and Hennessey, 1992:68). The intrinsic-motivation training tapes emphasized the importance of finding intrinsically enjoyable aspects to whatever one has to do and concentrating on them for maximum enjoyment.

Children in a control condition also participated in two group-training sessions with the same researcher, but the videotapes these children viewed had nothing to do with intrinsic motivation (Amabile and Hennessey, 1992:69). On these tapes, the same adult as on the training tape asked the same actors to discuss their favorite foods, rock groups or seasons of the year. The day after their second training session, all children participated in an individual testing session with a second researcher in a different room. The children's teachers and the researchers were careful to avoid mentioning any connection between the training and testing sessions and denied a connection if the children asked. The testing session was aimed at obtaining two main measures: firstly, a measure of the child's intrinsic/extrinsic motivational orientation, as assessed by Harter's *Test of intrinsic versus extrinsic motivation in the classroom* (Harter, 1981:311) and secondly, a measure of creativity in the presence or absence of a salient extrinsic constraint – Amabile's standard paradigm. In this case, the

creativity task was storytelling and the extrinsic constraint was a reward of using a Polaroid camera. Thus, this testing session (after the completion of Harter's test by each child) followed a 2 x 2 experimental design. Half of the children experienced the intrinsic motivation training and half were in the control group. As a cross-dimension, half explicitly contracted with the researcher to tell a story in exchange for permission to take some pictures with the camera, while the other half simply took pictures as an activity preceding the storytelling (Amabile and Hennessey, 1992:69; Houtz, 2003:210).

The results of the study indicated in the first instance that the children who were trained scored significantly higher on Harter's intrinsic interest scale than the children who were not trained (Amabile and Hennessey, 1992:70). The second finding indicated that although the children in the control group showed the usual decrement in creativity under conditions of contracted for reward, the children in the intrinsic motivation training group showed no such decrement. In fact, they scored significantly *higher* on creativity under conditions of contracted-for reward. The study indicated remarkably, that it is possible to 'immunize' individuals (at least temporarily) against the negative effects of extrinsic incentives in a way that contributed to, rather than undermined, creativity (Amabile and Hennessey, 1992:70). Two subsequent investigations by Hennessey, Amabile and Martinage (in Houtz, 2003:211) have replicated these initial findings. The results of these training studies suggested that the researchers were successful in teaching children to take the focus off external goals and constraints and to concentrate on intrinsic motives (Amabile and Hennessey, 1992:71). In response to the findings of these studies, Amabile and Hennessey concluded that if intrinsic motivation were to be cultivated deliberately, it is essential to teach individuals to cognitively distance themselves from, but not ignore, extrinsic constraints (such as grading) so that these factors do not overwhelm the intrinsic enjoyment of their work (Amabile and Hennessey, 1992:72; Dacey and Lennon, 1998:83). This approach may also be useful to reduce potential negative effects of grading on graphic design students.

Deci and Ryan (1992:15) agree that if the relative salience of rewards is consciously reduced, they should be less disruptive. Ross (in Houtz, 2003:204) conducted a study to indicate that the negative effect of external rewards on intrinsic motivation depends not merely on their existence or expected attainment, but more importantly on their relative salience. Subjects in this study were led to expect a reward, an attractive game, for engaging in an activity in which they had previously shown interest. For some of the subjects, the game was placed directly in front of them as they worked on the task. For others, it was left out of sight. During subsequent free-play periods, those individuals for whom the reward was made salient exhibited significantly less interest in the task than the others did. This study

seem to support the findings of the training studies mentioned previously, namely that the detrimental effects of rewards may be reduced if their relative salience is reduced.

Jensen (1995:246) believes that the detrimental effects of extrinsic constraints such as grading may be reduced if students are taught to be creative for their own reasons based on their perceived needs, values, belief systems, emotions and goals. He remarked that this may be achieved through 'emphatic student-lecturer communication and a complex set of orchestrated, interactive, empowered learner choices'. Petty (1997:179) agrees that, in order to sustain intrinsic motivation for creativity, students should not focus on the apparent requirements for a good grade, but should be guided to ask questions such as: 'what do I think is most important?'; 'what do I get most enjoyment from in my work?' and 'what do I want to achieve here?'. Petty (1997:180) warns that answering these questions is often 'hugely challenging and may require very deep thinking', but he emphasizes their importance by saying that 'one's personal values and purposes are one's ultimate motivators'.

Jensen (1995:244) also suggests that intrinsic motivation and creativity is sustained by an emphasis on the personal relevance of the tasks that need to be done. He argues: 'from a survival point of view, the brain is best designed to learn what it needs to learn to survive. When the content of the material is perceived as being needed by the learner, motivation goes up. Or, if it's personally meaningful, the intrinsic rewards are highly likely to happen on their own'. Thus it seems as if the rewards gained by the personal relevance of tasks should 'justify' their presence and reduce the possibility of an 'over-justification' effect referred to earlier. In graphic design education, this strategy may include the demonstration of the usefulness of certain skills in real life situations typical of the industry.

Jensen (1995:297) suggests that students should be informed about the importance of intrinsic motivation for creativity. He recommends that they should become aware of their own levels of intrinsic motivation by filling in 'attitudinal surveys', asking questions such as 'how did you feel about this subject when we first started?' These need to be followed up progressively at a later change to determine if the learners have changed their feelings about it (Jensen, 1995:297). Amabile (1989:64-67) also devised an *Intrinsic/extrinsic motivation test* (Annexure G) that she recommends to be used in education to identify intrinsic and extrinsic motivation in students. These devices may be valuable tools to measure levels of intrinsic motivation and identify possible extrinsic constraints in the pursuit of higher levels of creativity in graphic design students.

Jensen (1995:242) proposed that the negative impact of rewards on intrinsic motivation (and subsequently on creativity) may be reduced if their predictability - which is an inherent

feature of rewards - is reduced. Jensen suggests if there is absolutely no predictability, a reward is defined as a 'celebration' or an 'acknowledgement'. He suggests that reward systems must be reduced to the absolute minimum and replaced with an increase in less predictable alternatives such as verbal and non-verbal acknowledgements of competence, increased feedback, praise, certificates, encouragement of peer recognition of successes and impromptu celebrations marking periodic success (Jensen, 1995:243-245). Although engaging in an activity only to obtain a contracted-for reward can undermine creativity, Amabile *et al.* (1996:5) points out that creativity can be enhanced by expecting a reward that is perceived as a 'bonus', a confirmation of one's competence, or a means of enabling one to do better, more interesting work in the future. Starko (1995:258) agrees that if a reward is occasionally presented as a pleasant 'surprise' after the performance rather than regularly as an expected payoff, it should not affect students' intrinsic motivation. She suggests that rewards pointing out the inherent value and interest of the creative task itself may increase intrinsic motivation. For example, outstanding art projects may be rewarded with the opportunity to create a personal gallery or compile a special portfolio for display to other students. These strategies send the message that creative activities are interesting and valuable; participating in them is reward itself.

The majority of these suggestions to minimize the effects of extrinsic constraints on intrinsic motivation and creativity are based on the belief that intrinsic motivation is an important prerequisite for high levels of creative ability. They are offered by authors who attempt to establish educational methods that would maintain intrinsic motivation in students with the ultimate aim to increase their creative performance. Although there may be several other strategies to achieve this, the strategies referred to in this discussion do at least provide some direction for the minimization of extrinsic constraints in graphic design education. However, apart from these suggestions, other factors such as certain types of feedback, competition and availability of choice in the educational environment have also been postulated to affect intrinsic motivation and subsequently creativity. The following sections address these issues.

3.4 The impact of various feedback styles on intrinsic motivation

Despite the apparent damaging effects of evaluation procedures on intrinsic motivation, *Cognitive evaluation theory* holds that certain forms of evaluative feedback could actually increase intrinsic motivation (Deci and Ryan, 1992:23). *Cognitive evaluation theory* was developed by Deci and Ryan with the aim to integrate all the results of studies on the effects of external initiating and regulatory events. As mentioned earlier in this chapter, this theory suggests that the experience of autonomy (versus being controlled) and the experience of competence (versus incompetence) are critical factors in determining motivational

processes. Deci and Ryan explain that feedback relevant to the initiation or regulation of behavior is experienced in one of three characteristic ways, thus prompting one of three sets of motivational processes. Feedback experienced as supporting autonomy and facilitating competence is labeled *informational*, as it tends to maintain or enhance intrinsic motivation. Feedback experienced as pressure to think, feel, or behave in specific ways is labeled *controlling*, as it tends to undermine intrinsic motivation, though it may strengthen extrinsic motivation. Finally, according to Deci and Ryan's theory, input experienced as promoting or signifying incompetence, such as negative feedback, is labeled *de-motivating*, as it tends to undermine both intrinsic and extrinsic motivation.

Deci and Ryan (1992:23) point out that any input, such as praise statement, for example, may be experienced in any one of these three ways. It may be experienced as affirmation of one's competence without evaluative or pressuring overtones, in which case it would be informational. Alternatively, it may be experienced as an evaluation, as something that pressures one to think and behave in a prescribed manner, in which case it would be controlling. Finally, a praise statement may be experienced as patronizing, or as the type of praise for effort, which implies that the person is really not competent. In such cases, it could be de-motivating. However, Deci and Ryan proposed that if a reward is structured to convey information, such as positive competence feedback in the absence of evaluative pressure, it is least likely to be undermining. On the contrary, it may even enhance intrinsic motivation (Pintrich and Schunk, 1996:275). It seems therefore, that an awareness of the various ways in which feedback may be experienced by graphic design students and how these experiences may influence their motivation, could contribute to the conscious maintenance of their intrinsic motivation and creativity.

Deci and Ryan (1992:24) note that although (on average) feedback tends to be experienced in one of these three ways many factors can affect how it will actually be experienced. Most notably, the interpersonal context within which the event occurs can lead it to having varying kinds of functional significance. Furthermore, there are individual differences in people's tendency to experience input in the three different ways. For example, in the context of an autonomous causality orientation (e.g. if the person already feels self-determined and competent at the task), negative feedback will not necessarily be the most salient de-motivating factor (Houtz, 2003:205).

Houtz (2003:204) noted that although negative feedback is likely to be experienced as de-motivating, if it serves as an indication of how to improve performance and facilitate future competence, intrinsic motivation may not decrease. In this instance it is likely to be experienced as informational and intrinsic motivation could be maintained or enhanced

(Houtz, 2003:205). Deci and Ryan (1992:13) indicated that most research on the effects of positive feedback found that intrinsic motivation was enhanced by the reception of positive feedback, presumably because it enhances people's experience of competence. However, O'Leary (in Pintrich and Schunk, 1996:344) notes that to be effective as a reinforcer, positive feedback or praise must be delivered contingent on performance of the behavior to be reinforced and be viewed by students as sincere and credible.

Jensen (1995:288) believes that the potential detrimental effects of grading on creativity may be reduced if grades are more often substituted with substantive feedback on individual projects. He recommends that grades should be used only as a final report at the end of a term, allowing more opportunities for feedback. Preferably, Jensen (1995:291) argues, feedback should address not only the outcomes of a project, but also aspects relating to the creative process or on progress made. In sum, it seems that the more 'informational' feedback - as opposed to 'controlling' feedback - is provided, the more conducive it will be to maintaining intrinsic motivation and creativity in graphic design students.

3.5 The effects of competition on creativity and intrinsic motivation

Another factor that seems to affect intrinsic motivation is a competitive environment (Deci and Ryan, 1992:18; Amabile and Hennessey, 1992:61). Studies have indicated that students who produced creative products to be judged in relation to the work of others frequently demonstrated less creative effort than when they produced similar products in a non-competitive situation (Starko, 1995:253). To explore the effects of competition on intrinsic motivation, Deci and his colleagues (1992:19) had subjects work on interesting puzzle problems in the presence of a confederate. Half the subjects were instructed to try to beat the other person and subjects in the other half were merely instructed to do as well as they could. In all cases, the confederates let the subjects finish first, so that those who competed won and those who did not compete received what can be thought of as self-administered positive feedback.

Results of this experiment indicated that the competition subjects displayed less subsequent intrinsic motivation than the non-competition subjects. Commenting on the study, Deci and Ryan (1992:19) said it appears that people's experience of competing in this situation tended to be controlling, even though subjects won the competition. They pointed out that if the subjects had lost, the feedback would have been negative and would, most likely, have been even more detrimental. Indeed, a study by Reeve and his colleagues (in Deci and Ryan, 1992:19) demonstrated that losers of a competition were significantly less intrinsically motivated than winners

In another study, Amabile and Hennessey (1992:61) found that subjects in an experimental group who made collages in a competitive setting produced work that were rated significantly less creative than the subjects in the control group. Additionally, in his discussion on competition and intrinsic motivation, Houtz (2003:207) referred to a study where forty-nine corporate executives, managers, educators and researchers solved creative problems related to a water jar. These problems required a set pattern of solutions for several problems and then required a different solution pattern for the last problem. Half the subjects were given competitive instructions telling them that a winner would be chosen based on the number of correct solutions and the time it took to solve the problems. More individuals in the non-competitive group were able to solve all the problems correctly. There may be a number of reasons why a competitive environment reduced creative abilities in these studies, but Deci and Ryan (1992:19) argues that the competition acted as an extrinsic constraint that shifted subjects' focus from the intrinsic to the extrinsic, thereby reducing their concentration and enthusiastic attention to the task.

However, Deci and Ryan (1992:18) pointed out that from a motivational perspective, competition is quite complex. They note that on the one hand, competition can foster intrinsic motivation since it offers people optimal challenges and feedback that may facilitate competence. Winning can affirm one's competence, as can performing well even when one loses. On the other hand, competition could be quite controlling. The focus on defeating another, for example, is extrinsic to performing effectively; and when defeating another takes on central importance, competitive behavior is likely to be more extrinsically motivated and thus undermining intrinsic interest and motivation.

Yet, Amabile (1983:100) also pointed out that some researchers contradict the hypothesis that competition may reduce intrinsic motivation and subsequently creativity. For example, she refers to Torrance who suggested that interscholastic problem-solving competitions can be used to foster creative development in school children. Indeed, in some early studies, Torrance found that competition (awarding prizes to high scores) increased the fluency and flexibility of children's responses to his test items. Furthermore, Amabile pointed out that Bloom and Sosniak, in a study of extraordinarily talented pianists and mathematicians, found that competition in the form of recitals, contests and concerts was quite common in the early lives of individuals who later went on to distinguish themselves in their talent fields.

It seems therefore, that the effect of competition on intrinsic motivation and creativity is not clear cut. As Starko (1995:253) remarked, 'like most educational dilemmas the answer to competition in the classroom is not simple'. In graphic design education, students are often encouraged to participate in national art and design competitions. Competition amongst

peers for lecturer recognition or good grades is also not uncommon in the classroom environment of graphic design teaching. In the least, it seems that an awareness of competition as a possible inhibitor or stimulant to optimum levels of intrinsic motivation and creativity should be kept in mind when teachers aim to deliberately foster creativity.

3.6 The effects of choice on creativity and intrinsic motivation

In their studies investigating the relationship between choice, intrinsic motivation and creativity, Amabile and Hennessey (1992:63) hypothesized that when a creative task is imposed on an individual, leaving no choice whether or not to engage in the task or how to engage in the task, intrinsic motivation for the task will be reduced and creative ability will be undermined. They tested this hypothesis in a study where subjects in one group were allowed to choose art materials to create collages as opposed to a control group where the experimenter made selections on their behalf. The study indicated that subjects who could choose materials themselves made collages that were rated significantly more creative than those made by subjects who did not choose their own materials. In addition, individuals who had free choice spent somewhat more time with collage materials during free-play than those in the no-choice condition (Amabile and Hennessey, 1992:63-65). Discussing the findings of the study, Amabile (1983:136) concluded that presumably the subjects who were given choice felt more self-determined than those not given choice. Hence, they were more intrinsically motivated and consequently, more creative. This observation is supported by Deci and Ryan's *Cognitive evaluation theory* that proposes that choice enhances a sense of self-determination by creating an internal locus of causality (in Houtz, 2003:208). According to this theory, when self-determination is manipulated through the perceived presence or absence of choice, intrinsic motivation and creativity also increases or decreases respectively.

This notion is supported by a study conducted by Zuckerman (in Pintrich and Schunk, 1996:271; Deci and Ryan, 1992:16) where college students either chose puzzles to solve or were assigned puzzles selected by others. Students who chose puzzles displayed higher intrinsic motivation than did those who had no choice. Amabile and Hennessey (1992:65) obtained similar results in a study that set out to determine whether limited choice in the way a painting is to be done affected subjects' intrinsic motivation and creativity. In the experimental group, restrictions pertaining to task neatness were given in terms of specific prescriptions. For the control group, no mention was made of these constraints. After the painting activity, subjects were left alone for a free-play session. The amount of time they spent painting during this session was used as a measure of intrinsic motivation. Finally, the participants were asked to rate how much they enjoyed the activity. Paintings made during the main session were rated by artist judges on creativity and results indicated that subjects

in the group where no prescriptions were given spent more free-choice time painting than those who received prescriptions. Most importantly, effects for limit-setting style were also found for creativity. The first group produced pictures that were significantly more creative than did the second group.

Except for their focus on creativity, none of these studies are, once again, directly related to the particular context of graphic design education. Yet, their findings highlight the general importance of choice in the pursuit of intrinsic motivation and may warn against an educational environment that lacks sufficient opportunities for choice. Pintrich and Schunk (1996:249) made suggestions to increase the opportunities for choice in education. They recommended that students should be allowed to choose some of the projects that they engage in. They suggested that certain core projects, papers and assignments should be made compulsory, but that students should be able to choose which *extra tasks* they prefer to engage in. According to them, this system would allow students to choose projects that they feel intrinsically motivated to engage in and would subsequently raise the creative effort put into the tasks (Pintrich and Schunk, 1996:342). It should be possible to employ such an approach in graphic design education where a wide variety of design focuses are usually part of the curriculum.

Deci and Ryan (1992:14) also noted that when individuals choose the activities they engage in, they display initiative. This leaves them feeling self-determined and further enhances their intrinsic motivation (Deci and Ryan, 1992:14). Balshaw (2004:75) observed that projects which engage young people in shaping the form and content of their learning are highly effective in improving learning experiences and outcomes, extending their concentration, motivation, imagination and achievement. Starko (1995:259) agrees that it is 'logical' that if students are allowed choice in creative tasks, they may work harder and do more than when tasks are consistently imposed from outside. But, Pintrich and Schunk (1996:249) warn that this does not mean the lecturer 'should turn over the curriculum to the students'. Rather, they propose, lecturers should aim to provide opportunities for students to do different activities and choose their own topics within a range of activities that fit the curriculum (Pintrich and Schunk, 1996:294).

Starko (1995:259) pointed out that when students are allowed more choice in task engagement, they are likely to choose methods and topics that they find enjoyable. As Amabile (1983:121) pointed out, a definite link exists between enjoyment, intrinsic motivation and creative ability. She remarked: 'the conducive effect of intrinsic motivation on creativity may be mediated by feelings of pleasure in a task approached as 'play'. According to Amabile, not only should factors that decrease the individual's enjoyment of a task

undermine creativity, but factors that increase the individual's enjoyment should enhance creativity. Indeed, people who are intrinsically motivated work on tasks because they find them enjoyable (Pintrich and Schunk, 1996:258; Hallman, 1971:221). The importance to emphasize enjoyment of tasks in order to raise students intrinsic motivation has been highlighted by a concept proposed by Csikszentmihalyi, entitled 'flow'. His theory is discussed in the next section.

3.7 Facilitating creativity through enjoyment

The relationship between enjoyment, intrinsic motivation and creativity is pertinently illustrated by the 'flow' phenomenon as posited by Csikszentmihalyi (1990:48; 1997:8-13). The concept of 'flow' is described as 'the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at a great cost, for the sheer sake of doing it' (Starko, 1995:260; Houtz, 2003:102). Flow is also associated with freedom to explore, examine, express and hence perpetuates curiosity and flexibility of cognition, leading to both playfulness and creative productivity (Houtz, 2003:103). According to Starko (1995:260), 'flow may be seen as the ultimate example of intrinsic motivation and is closely tied to creative behavior'. Many of the activities that traditionally elicit flow entail creative behavior. Artists painting, musicians practicing and scientists absorbed in their work are classic examples of individuals in flow.

Csikszentmihalyi (1990:48; 1997:10) postulated that if innovators maintain an optimal match between the challenge posed by the problem and their own skills, they will experience flow. Thus, in order to maintain flow, the level of challenge must constantly be raised to match the person's increasing skills (Starko, 1995:261; Amabile, 1983:82). Dacey and Lennon (1998:179) remarked that flow is the intrinsic reward for pursuing a challenging but attainable goal. Starko (1995:261) pointed out that if insufficient skill development precedes a challenging, potentially creative activity it is likely to be met with frustration and resistance. Thus, a student is unlikely to be intrinsically motivated to pursue a task that he or she perceives as being impossible. Conversely, insufficient challenge also impedes motivation. Furthermore, a task that may have previously been motivating becomes less so as one's skills increase and the challenge diminishes (Deci and Ryan, 1992:11). These observations highlight the importance of ensuring that challenges and skills are balanced in an educational context to sustain intrinsic motivation that may ultimately result in flow experiences (Pintrich and Schunk, 1996:279).

However, as Starko (1995:262) pointed out, since students will always have varied levels of skills, if lecturers want them to develop intrinsic motivation, perhaps leading to flow, some of the activities they pursue in school must vary from student to student. He remarked: 'as long

as all of the students work on the same piece, they cannot all be challenged'. This observation once again points to the need for more choice opportunities in the educational milieu that allow individual students to identify tasks (possibly in consultation with a lecturer) that provide an appropriate match between challenge and skill. As pointed out earlier, empowering students to choose more activities should also contribute to their enjoyment of tasks, which in turn are postulated to raise intrinsic motivation and creativity (Houtz, 2003:211).

3.8 Conclusion

In summary, many of the studies and theories presented in this discussion show a strong link between intrinsic motivation and creative performance. They support Amabile's notion that intrinsic motivation is most supportive of creativity, suggesting that extrinsic motivation is detrimental to creativity. Pintrich and Schunk (1996:257) remarked that it is tempting to think of intrinsic and extrinsic motivation as two ends of a continuum - the higher the intrinsic motivation, the lower the extrinsic motivation. In fact, they believe there is no automatic relation between intrinsic and extrinsic motivation. They pointed out that an 'individual may be high on both, low on both, medium on both, high on one and medium on the other and so forth' concluding that it is more accurate to think of intrinsic and extrinsic motivation as separate continuums, each ranging from high to low (Pintrich and Schunk, 1996:258). Furthermore, the same activity can be intrinsically or extrinsically motivating for one individual, but intrinsically motivating for another.

Still, as far as intrinsic motivation as a prerequisite for high levels of creativity is concerned, several authors have confirmed that the body of research on intrinsic motivation and creativity is substantial enough that it cannot be ignored (Houtz, 2003:255; Starko, 1995:253). Although Amabile and colleagues' research methods have been criticized for its exclusively social-psychological focus (Green, 2002) or its focus on self-determination and romantic perspective (Eisenberger & Shanock, 2003:124), the research cited in this chapter offers considerable support for the intrinsic motivation hypothesis of creativity. Overall, these studies support the hypothesis that intrinsic motivation fosters creativity, while controlling extrinsic motivation inhibits creativity. It suggests that a variety of external constraints may undermine creativity, as long as those constraints can lead individuals to view their work as extrinsically motivated rather than intrinsically motivated. Such constraints might include certain types of feedback, rewards and competition. However, it has also been demonstrated that certain situational factors can be conducive to intrinsic motivation and creativity. These include the availability of choice opportunities that enhances self-determination, informational feedback that could enhance the attainment of competence as well as emphasizing task enjoyment. All of these strategies are aimed at obtaining the ultimate goal: to ensure high

levels of intrinsic motivation that could result in dedicated task engagement needed for optimum creative ability in students.

It is important to note that the cultivation of intrinsic motivation entails only one strategy of the proposed Methodology for deliberately fostering creativity in graphic design education. As explained in the previous chapter, the Methodology comprises a total of six interactive, interdependent strategies. Therefore, although intrinsic motivation may play a significant role to foster creativity, its potential to achieve this goal is likely to be greatly enhanced by the cumulative effect of the six strategies when employed together. The next strategy, namely the promotion of autonomy in students, is discussed in the following chapter.

SELF-REGULATION AND CREATIVITY

Introduction

This chapter aims to indicate the significance of autonomous, self-regulative behavior for creative ability. It argues that a sense of independence, freedom and individualism are important prerequisites for creativity to flourish. With regard to the educational milieu, it is postulated that controlling events and environments that pressure students to think, feel or behave in particular ways, reduce their sense of individuality and autonomy needed for maximum creative ability. A number of research studies that supports this hypothesis are discussed. The relationship between autonomy and intrinsic motivation is highlighted, indicating that individuals are more likely to self-regulate if they are intrinsically motivated. Three types of strategy information (conceptual, procedural and conditional knowledge) that students need to effectively self-regulate are outlined. The self-regulative processes of self-observation, self-reaction and self-judgment are discussed with regard to their application in graphic design education. Various educational strategies to facilitate self-regulation in students are discussed. Characteristics of an autonomous, supportive educational environment are described and finally, guidelines for evaluation procedures that support autonomy in graphic design students are provided. Emphasis is placed on self-evaluation as an important aspect of self-regulation.

4.1 Autonomy as prerequisite for creativity

Autonomous behavior implies independent, self-sufficient behavior. The relationship between independence (autonomy) and creativity was highlighted by a number of research studies that investigated characteristics associated with creativity. Amabile *et al.* (1996:7) points out that several researchers have concluded that creativity is fostered when individuals and teams have relatively high autonomy in the day-to-day conduct of the work and a sense of ownership and control over their own work and their own ideas. Characteristics such as independent thinking and individuality have long been associated with creative thinking (Treffinger, *et al.*, 2003:326). Researchers consistently have found that creative people are self-reliant (van Demark, 1991:25) and have a strong drive for independence of thought and action (Hayes, 1989:137). Runco (1997:94) reviewed the research on personality traits in creative people and concluded that 'creative people are marked by greater autonomy, non-conformity and independence of attitude'. Using a case study approach, Feldhusen (in Houtz, 2003:101) studied the lives of twenty creative people and also found that they were all

characterized by a strong sense of independence and individualism. Additionally, in a study where Gardner (1999:15-28) investigated the lives of seven highly creative people - Freud, Einstein, Picasso, Stravinsky, Eliot, Graham and Gandhi - he found that their creativity was fuelled by characteristics such as non-conformism, individuality and independence.

Several authors have recognized the importance of individuality and autonomy for creativity to thrive. In his discussion on mind-sets that are conducive to creative ability, Petty (1997:118) emphasized that creativity is synonymous with an independent, non-conformist attitude, stating that creativity 'relies on an ability to continually question accepted practice and refuse to accept the views of others' (including those of critics, clients and those in authority). From an educational point of view, Starko (1995:250) argues that if students' creativity were to be enhanced, they must begin to develop their own ideas, own judgments and own interests, rather than always pursuing paths forged by their teachers. He notes that if these traits were to be developed in students, educators must create classrooms that increase their autonomy. In his article on the training of creative ability, Hallman (1971:220) indicated that creativity seems to flourish in non-authoritarian and non-controlling environments, which foster a sense of autonomy in individuals. Esquivel (1995:190) in her article on teacher behaviors that foster creativity also noted that a authoritarian classroom climate reduce students' creative abilities. Deci and Ryan (1992:15) agreed that controlling events and environments that pressure people to think, feel or behave in particular ways, reduce their sense of freedom, individuality and autonomy that are needed for maximum creative ability.

A number of research studies support the hypothesis that controlling events may reduce the sense of autonomy and self-determination of individuals. For example, a study by Koestner and colleagues (in Deci and Ryan, 1992:22; Amabile, 1996:177) investigated the effects of the experience of control in subjects versus the experience of autonomy on creativity and found that authoritarian instructions had a negative impact on creativity. The study imposed control on one group of subjects using words such as 'should' and 'must' in instructions relating to the use of art materials in paintings. No limits were placed on the control group. The results of the study indicated that the group who experienced controlling instructions produced paintings that were judged to be significantly less creative than the no-limits control group. In another study, where fashion design students drew sample garment designs, those given choice in how they structured their work produced designs that were rated more creative than did those not given such choice. It is postulated that the experience of choice made subjects feel more self-determined and independent, thereby enhancing their creative ability (Amabile, 1983:136). Additionally, in a study by Deci and his colleagues (in Amabile, 1996:204) teachers' beliefs in the importance of student autonomy correlated significantly

and positively with their students' preference for challenge, curiosity and desire for independent mastery. Although the study was not directly examining creativity, it supports the notion that the experience of autonomy is conducive to creative ability.

These studies and arguments suggest a strong relationship between creative ability and a sense of autonomy in individuals. It implies that the strategic and purposeful cultivation of autonomy in students should be an integral part of a comprehensive Methodology aimed at the deliberate fostering of creativity. The experience of autonomy is closely related to the previous proposed strategy, namely the fostering of intrinsic motivation in students. Indeed, as noted earlier, the proposed strategies are highly interdependent and interactive. The relationship between intrinsic motivation and autonomy is outlined in the next section.

4.2 The relationship between autonomy and intrinsic motivation

The notion that a sense of self-rule and autonomy is an important prerequisite for creativity has been aptly demonstrated by the body of research on intrinsic motivation that was discussed in the previous chapter (Amabile and Hennessey, 1992:58-60; Houtz, 2003:204; Starko, 1995:254) These studies indicated that the intrinsic motivation and creativity of subjects were significantly reduced in controlling circumstances that affect their autonomy (such as an emphasis on grading, competition and a lack of choice). Amabile (1983:118) pointed out that self-determination is a hallmark of intrinsic motivation, stating that 'self-perceptions of personal freedom and individualism are necessary for creative thought and expression'. She quoted Crutchfield's postulation that a basic antipathy exists between conformity and creative thinking, arguing that 'conformity pressures tend to elicit different kinds of motivation in the individual that are incompatible with the creative process' (Amabile, 1983:75). According to Crutchfield (quoted in Amabile, 1983:76), such conformity pressures reduce autonomy and individualism, leading to extrinsic, 'ego-involved' motivation, in which the creative solution is a means to an ulterior end. This contrasts sharply with intrinsic, 'task-involved' motivation, in which the creative act is an end in itself.

When people experience autonomy, it fuels their intrinsic motivation, which in turns fuels their creativity (Mc Combs, 2001:82). Students are more likely to self-regulate if they are intrinsically motivated. Mc Combs pointed out that if students are intrinsically motivated, self-regulation of the creative process occurs naturally. That is, in situations the learner perceives as related to personal interests and goals that can be pursued in self-determining ways, the learner is usually not even aware that he or she is engaging in self-regulatory processes and behaviors. Thus, when an individual is intrinsically motivated, autonomy and self-regulation seem to happen automatically. According to Pintrich and Schunk (1996:236), the independence that is demonstrated by intrinsically motivated students usually results in

independent mastery attempts (rather than dependence on the teacher) as well as independent judgment (rather than reliance on teacher's judgment). These processes seem to be marked by an 'internal locus of control' (as opposed to external control) that tends to employ internal criteria for success and failure rather than external criteria.

Deci and Ryan (quoted in Pintrich and Schunk, 1996:270) described intrinsic motivation as 'the human need to be competent and self-determining in relation to the environment'. Because the need for self-determination (autonomy) underlies intrinsic motivation, Deci and Ryan (2002:15) have hypothesized that the same contextual factors supporting self-determination will maintain or enhance intrinsic motivation for that activity, whereas those that control one's behavior vis-à-vis the activity will undermine intrinsic motivation and subsequently creativity. Therefore, any external event that is experienced as pressure to perform in a particular way or to attain a particular outcome that limits people's self-determination shall correspondingly undermine their intrinsic motivation (Deci and Ryan, 1992:17). As indicated in Chapter 2, these pressures may include factors such as rewards (or grading), competition and prescriptive regulations that do not allow sufficient opportunities for choice. It seems therefore, that the recommendations made in the previous chapter to sustain intrinsic motivation may also contribute to the maintenance of autonomy in graphic design students.

Because intrinsic motivation relates to the psychological needs to feel competent and self-determining, the experiences of competence and autonomy are important for maintaining intrinsic motivation (Deci and Ryan, 1992:11). As pointed out earlier, when individuals are intrinsically motivated, the process of self-regulation happens naturally (Mc Combs, 2001:82). Just as self-determination is the hallmark of intrinsic motivation (Amabile, 1983:118), self-regulation may be viewed as the hallmark of autonomy. The next section explores methods to stimulate and facilitate self-regulation in education.

4.3 Facilitating self-regulation in graphic design education

Theory and research on self-regulated learning (SRL) emerged in the mid-1980s to address the question of how students become masters of their own learning processes (Zimmerman, 2001:1). Essentially, being able to function autonomously in an educational environment, implies an ability to self-regulate learning behavior. The term 'autonomous' has been repeatedly used as synonymous with the term self-governance (Deci and Ryan, 2000:330). If we accept that autonomy is an essential prerequisite to sustain creativity in graphic design students, it is appropriate to consider the principles reflected in the body of literature that focuses on SRL. SRL views learning as an activity that students do for themselves in a

provocative way, rather than as a covert event that happens to them reactively as a result of teaching experiences (Pintrich and Schunk, 1996:270). A self-regulated learning perspective on students' learning and achievement has profound implications for the way educators should interact with students and the manner in which educational environments should be organized (Zimmerman, 1990:4). This perspective shift the focus of educational analyses from students' learning ability and environments as 'fixed' entities to their personally initiated processes and responses designed to improve their ability and their environments for learning.

The key issue defining learning as self-regulated is not whether it is socially isolated, but rather whether the learner displays personal initiative, perseverance and adaptive skill in pursuing it (Zimmerman, 2001:1). These students self-generate thoughts, feelings and actions to attain their learning goals (Zimmerman, 2001:5). According to the traditional model of learning, students were theorized not to initiate or substantially supplement experiences designed to educate themselves. In contrast, SRL theories assume that students (a) can personally improve their learning strategies; (b) can proactively select, structure and even create advantageous learning environments; and (c) can play a significant role in choosing the form and amount of instruction they need.

Zimmerman (2001:5) notes that students are self-regulated to the degree that they are meta-cognitively, motivationally and behaviorally active participants in their own learning processes. According to cognitive psychology, 'meta-cognition' refers to the executive processes that oversee, regulate and orchestrate the activities of cognition (Armbruster, 1989:177). It includes both the knowledge and the control that individuals have over their own cognitive processes and are therefore an integral aspect of self-regulation. Pesut (1990:105) defines creativity as a self-regulatory meta-cognitive process. He believes that most creativity training programs are successful because they provide the participants with meta-cognitive experiences, knowledge and strategies. Acknowledging the cognitive dimension of creativity, Armbruster (1989:178) relates the notion of meta-cognition to the conscious management of the separate cognitive stages of the creative process, such as 'preparation, incubation, illumination and verification'. Similarly, referring to it as 'process-control', Petty (1997:16-19) believes that creative ability shall be greatly enhanced if individuals understand and apply the various stages of the creative process meta-cognitively. Petty describes the cognitive processes involved in the various steps of the creative process as 'clarification, distillation, perspiration, evaluation and incubation'. The notion of 'process-control' is also the central concept behind the well-known *Osborn-Parnes model for creative problem-solving* (Parnes, 1992a:136), which guides the thinker through six distinctive stages in the creative process

(Objective-finding; Fact-finding; Problem-finding; Idea-finding; Solution-finding; Acceptance-finding).

The conscious manipulation of thinking processes relates closely to Mc Comb's (2001:83) definition of meta-cognition. She describes it as 'thinking about thinking' – an appropriate description of the process, since regulating the creative process literally implies that an individual has to think about his or her one own thinking processes. Each stage of the creative process requires a different mind-set and regulating these phases implies that the creator must be able to consciously (and meta-cognitively) shift from one stage to another and adopt the appropriate mind-set for that thinking phase. Assisting students in the meta-cognitive regulation of the various phases of the creative process seems to be an important step towards their autonomy. These processes are described in Chapter 8 as 'Strategy 6' of the proposed Methodology.

Additionally, from a meta-cognitive perspective, students may also apply lateral and divergent thinking techniques that are described in Chapter 7, to purposefully stimulate the generation of creative ideas, such as Mind-mapping, 'Synectics' and 'Random Associations'. In essence, the process of deliberately employing divergent thinking techniques to solve creative problems also implies a process of 'thinking about thinking' - as Mc Combs (2001:83) phrased it. The cognitive strategies proposed in the Methodology for fostering creativity provide vital resources for self-regulation for graphic design students. The fact that self-regulation (as a strategy to maintain creativity) may include knowledge of cognitive strategies such as 'process-control' and divergent thinking techniques, points once again to the interdependency of the proposed strategies. In fact, strictly speaking, many of the other strategies of the proposed Methodology (such as stress management and the maintenance of intrinsic motivation or self-belief) may be utilized by graphic design students for self-regulation to enhance their creativity.

In his discussion on self-regulation and education, Paris *et al.* (2001:273-274) identified three types of strategy information that are needed to effectively self-regulate. He advises that firstly, students should develop a thorough conceptual understanding of the *functions and purposes* of a repertoire of strategies (conceptual knowledge). Secondly, students must understand *how to use* strategies (procedural knowledge). Thirdly, they should understand *when and why* strategies are effective (conditional knowledge). Paris *et al.* (2001:274) points out that if students understand when and why strategies are effective, it should help them to choose between strategies. Furthermore, knowing when and why to use a strategy may be fundamental for students' spontaneous shift between appropriate strategies. Most importantly, achieving success through the application of a particular strategy will provide the

direct evidence that the student has learned the appropriate skills associated with the strategy and will do much to increase a sense of autonomy (Pintrich and Schunk, 1996:231).

The utilization of the different types of strategy information may be illustrated with the following example relating to graphic design education. If a graphic design student, through a process of self-regulation, succeeds to generate a truly original idea through the use of a divergent thinking strategy (applying procedural knowledge), while, when the need arises, employing a stress management strategy to maximize his or her creativity (applying conditional knowledge), it may raise the individual's sense of self-efficacy and self-determination, that may ultimately contribute to more autonomy and intrinsic motivation in the student (resulting in conceptual knowledge). Individuals who feel efficacious are hypothesized to work harder and persist longer when they encounter difficulties than those who doubt their capabilities (Schunk, 1991:208). If intrinsic motivation levels are raised, creativity may be further enhanced, leading to more successes, which in turn may increase a sense of self-belief ('Strategy 4' of the proposed Methodology). Higher levels of self-belief may once again stimulate self-regulation processes that in turn rely on the different types of strategy information for their effective execution. This process implies a cyclical process that starts with self-regulation and ends with self-regulation. Several other such examples of the way that strategies and strategy information may be used to self-regulate may be devised. Naturally, for this process to unfold as in this example, it shall be required that students and lecturers are fully acquainted with the aims, potential and mechanisms of the strategies of the proposed Methodology for the fostering of creativity.

Self-regulation has been conceptualized as involving three key sub-processes: self-observation, self-reaction and self-judgment (Pintrich and Schunk, 1996:130). The first self-regulatory process, namely self-observation, implies that an individual consciously observes his or her own activity to determine when, why and how creative ability is affected by it. For example, one could observe the conditions under which creativity usually occurs in order to consciously replicate favorable conditions for the creativity. If for instance, a student notes that he or she tends to arrive at creative solutions while playing sport, or after 'sleeping' on the problem, or while 'doodling' with visual concepts. Self-observation is postulated to be most helpful when it focuses on the specific conditions under which learning (or creativity) occurs, such as the time, place and duration of performance (Zimmerman, 2001:10). Research found that the regularity and proximity of self-recording are critical to the accuracy of self-observational responses (Schunk, 2001:130). Schunk even recommends the use self-recording diaries, progress worksheets or behavioral graphs to aid self-observation. Ultimately, Zimmerman (2001:22) argues, success in self-regulation is dependant on the

accuracy of self-observation because this process provides the necessary information to guide subsequent efforts to self-regulate.

The second self-regulative process, namely *self-reaction*, implies a process where a person purposefully employs a strategy in response to self-observation to enhance creativity. Such strategies may include 'motivational control strategies' that involve visualizing positive or negative consequences of success and failure or 'emotional control strategies' such as self-instructions to relax (Zimmerman, 2001:25). According to Mc Combs (2001:92), managing emotions is 'a self-referenced process that is at the core of self-regulation'. This process refers to the ability to monitor one's own and others' emotions and then to use this information to guide thinking and action (Mc Combs, 2001:93). An example relating to graphic design education may once again illustrate this point. If a student effectively monitors the emotional interaction that tends to take place during feedback sessions between a lecturer and her/himself, it may be possible to identify, for example, self-defensive attitudes by one or both parties. This knowledge may be used to examine the causes for self-defenses such as, for example, low levels of self-belief. If strategies are employed to increase self-belief, such as those recommended in Chapter 5 of this thesis, emotions during feedback sessions may be controlled (regulated) accordingly, resulting in more constructive feedback sessions and higher levels of creativity. The third self-regulative process namely, self-judgment is discussed later in this chapter under a separate heading (section 4.5).

Starko (1995:264) pointed out that it could not be expected that students are naturally capable to self-regulate. He emphasizes that educators must realize that students must be *taught* to self-regulate. Starko argues that if educators aim to enhance students' creativity through self-regulation, it is not sufficient to *tell* them to be independent. He recommends that the advantages and strategies for self-regulated learning should be taught to students through structured lectures (which is essentially the aim of Unit 4 in the proposed Learning Program). In the context of graphic design training, such lectures may include topics such as time management, the conscious control of the creative process, potential applications of divergent thinking strategies, as well as techniques to eliminate creative blocks (such as the techniques discussed in Chapter 7). Many of these aspects are included in the proposed Learning Program with the aim to empower students with self-regulation skills that could be used to enhance their own creativity.

Pintrich and Schunk (1996:339) recommend that teaching students to self-regulate should also include *strategy value information* - informing students about the usefulness of a strategy as an aid to performance. Additionally, 'strategy feedback' informs learners about how well they are applying a strategy and how strategy use is improving their performance.

Students should be aware of independence as a goal and monitor their progress towards that end (Starko, 1995:265). Mc Combs (2001:109) argues that the interventions most needed to cultivate autonomy in students are those that teach them about their psychological functioning, how to create a different psychological vantage point or shift in perspective regarding themselves and their capabilities to regulate their own creativity.

Teaching students to be autonomous may be aided by the use of a short questionnaire devised by Petty (1997:155) to determine the levels of independence in students. The questionnaire is available as Annexure H. Although not as comprehensive as Amabile's *Intrinsic/extrinsic motivation test* (1989:64-67) referred to in Chapter 3 (section 3.2), Petty's questionnaire could be used by creative students to determine whether they are predominantly 'approval centered' or whether they tend to function autonomously when they do creative work. Being dependent on the approval of others for creative work signifies that an individual may not be sufficiently autonomous and individualistic to produce truly authentic work (Eiffert, 1999:7). Since autonomy and intrinsic motivation are so closely related, it may be useful to employ this questionnaire alongside Amabile's *Intrinsic/extrinsic motivation test*. In fact, Petty's questionnaire may also indicate intrinsic or extrinsic motivational orientations, for example, being 'approval centered' may indicate extrinsic motivation.

Another strategy to promote autonomy in students is to ask them to set their own proximal and long-term goals regarding the completion of their work (Pintrich and Schunk, 1996:385). Locke and Latham (in Isaksen *et al.*, 1993:296) have shown that when people are given a chance to choose their own goals, the more motivated they become to achieve those goals, especially when the goals are carefully and specifically formulated. Proximal (close-at-hand) goals promote self-efficacy and motivation better than distant goals because it is easier to judge progress toward the former (Pintrich and Scunck, 1996:176). For the same reason, goals incorporating specific performance standards raise efficacy and motivation better than general goals (such as 'to do my best'). Typical proximal goals in graphic design education may include realistic time management schedules for the completion of the different stages of an assignment, such as research, 'scamping', first and second drafts and final presentations. An example of a goal that incorporates *specific* performance standards might be to design a logo that accurately fulfils the needs of the client, as opposed to a *general* goal such as attempting 'to design a great logo'. The latter may be too vaguely formulated to stimulate self-regulation and motivation.

The notion of self-regulated learning contrasts with the age-old model of teaching, with the emphasis on structure and authority, external constraints and direction (Ryan, *et al.*, 1992:168). Mc Combs (2001:106) defined self-regulated learning as a synergistic process –

a process of teacher-student interaction in which the teacher provides the student with assistance in developing various strategies and skills for self-directed learning, gradually giving students increasing responsibility for using and defining these learning strategies for themselves. According to Mc Combs the self-regulated learner is characterized by self-confidence, initiative, persistence in learning; self-discipline, curiosity, enthusiasm and has a tendency to be goal-oriented. The merits of these characteristics for the maintenance of creativity in graphic design education are self-evident. Another advantage of self-regulation for graphic design education is that independent work is often a logistical necessity if students are to work at varied levels of challenge and abilities (Starko, 1995:264). Therefore, establishing a classroom climate that supports autonomy and self-regulation seems to be essential for the deliberate fostering of creativity in graphic design students. The characteristics of such an autonomy supportive classroom are explored in the next section.

4.4 Characteristics of an autonomy supportive educational environment

Research published by Mac Kinnon (1971:203) on the relationship between creativity and independence in individuals provides some clues to the ideal educational environment to foster autonomy. Mac Kinnon investigated the way that parental guidance influenced the independence of highly creative subjects and, although the study was not aimed directly at education, it suggests that *attitudes and expectations of educators towards students* are vital factors in the development of autonomy in students. Mac Kinnon concluded:

The independence of our creative subjects appears to have been fostered by parents who, very clearly, showed an extraordinary *respect* for the child and *confidence* in his ability to do what was appropriate. The expectation of the parent that the child would act independently but reasonably and responsibly appears to have contributed much to the latter's sense of personal autonomy which was to develop later to such a marked degree (author's italics).

The study seems to suggest that when individuals experience respect and trust from authorities, their autonomy may be enhanced. In his discussion of factors that influence creative ability, Petty (1997:181) also recognizes that the 'crucial factor' in a person's experience of self-determination is whether educators are 'controlling or trusting'. He notes that implicit in a high level of control is a lack of trust in a person. Therefore, if a student is not provided an opportunity to function autonomously to a certain extent, the educator is saying in effect that he or she lacks the abilities to work without detailed guidance and surveillance (Petty, 1997:182). In her discussion on teaching methods that support creativity in music education, Wiggins (1999:32) notes that 'we have a long history of teacher control'. She says the teaching profession has a long history of assuming that students bring little or no knowledge into the classroom, operating on the assumption that it is the teacher who is the expert and that the students have little or nothing to bring to the educational context. Sternberg (2004:199) remarked that if educators are to develop creativity in students, they

have to be especially careful not to dismiss students' views simply because they do not fit their own views of the world. These arguments agree with Van Demark's (1991:176) description of the two 'most significant' causes for creative blocks in individuals: firstly, if individuals experience disrespect, distrust and disregard for their creative ideas and secondly, if one experiences intentional efforts to be manipulated, guided, controlled, converted or forced. Both these two processes seem to affect an individual's sense of competence and autonomy negatively.

The concept of trust in the classroom is closely related to the notion of 'psychological safety' as proposed by Carl Rogers (in Eiffert, 1999:6), an American psychologist of the Gestalt tradition, who theorized about internal and external conditions for creativity to flourish. He regards psychological safety as one of the most significant conditions needed for creativity. According to him psychological safety is established when individuals are treated with empathy and are accepted to have 'unconditional worth'. According to Starko (1995:252) any act sending the message that students are important, valuable and full of potential builds a foundation of psychological safety. These conditions allow students to feel safe enough for exploration, risk taking and challenge. He notes that perhaps the most obvious type of acceptance is the teacher's willingness to examine students' ideas, even when they initially appear strange or inappropriate. This type of classroom sends a message that says: 'Of course you will work hard. I expect that you will make mistakes and some of your ideas will not work, but that is fine. I expect that you will keep trying and eventually you will make it'. Brown (1996:41) said creativity is fostered when authorities 'listen without resistance'. It involves suspending one's own certainties in order to consider alternative points of view. Fleith (2000:148) published a study to investigate teachers and students perceptions about characteristics which either stimulate or inhibit the development of creativity in the classroom environment. The findings suggest that both teachers and students believe that a classroom environment which enhances creativity provides students with choices, accepts different ideas, boosts self-confidence and focuses on students' strengths and interests (thus activities that boost their intrinsic interests). On the other hand, in an environment which inhibits creativity, ideas are ignored, teachers are controlling and excessive structure exists.

Society in general is not tolerant of individualism and non-conformity. Cultural and social pressures condition youngsters that it is 'normal' and 'safe' to conform (Eiffert, 1999:27). Traditional school systems are known to prefer obedience above individuality. It is not uncommon if a student who occasionally asks original and unexpected questions or suggests alternative answers to an authoritarian teacher is devalued and labeled as 'disruptive' (Dacey and Lennon, 1998:69). Therefore, according to Van Demark (1991:201), an educational environment that promotes individualism and non-conformism may cause some students to

feel uneasy or 'unsafe' (even it is experienced sub-consciously). They may have been subconsciously conditioned that there are risks involved when one deviates from the norm. Although graphic design students, due to their natural inclination towards creativity, may be less prone to these social and cultural influences, it may still be necessary to 're-condition' them that, in order to be creative, it is acceptable and recommendable to deviate from the norm. This type of re-conditioning can only happen, as Rogers (in Eiffert, 1999:6) indicated, in a trusting, psychologically safe environment that protects and nurtures individuality.

However, a trusting environment that promotes independence, individualism and freedom of expression, does not imply a chaotic, unstructured environment. Mac Kinnon (1971:203), in discussing the results of his study referred to earlier, points out that the parents in his investigation did not leave the life space of the child *unstructured*. He notes that within the family there existed clear standards of conduct and ideas as to what was right and wrong, but at the same time there was an expectation, if not requirement, of active exploration by the child and the internalization of a framework of personal conduct. There appear to have been both structure and freedom which carried with it expectations of reasonable and responsible action. It could be expected that - for the subjects under investigation, as well as for graphic design students - the experience of 'freedom' may be necessary for creative expression, while the experience of 'structure' is necessary for the experience of psychological safety. Isaksen and Lauer (2002:78) also referred to 'structured freedom' as a prerequisite for creativity. He notes that it is a 'major mistake' to assume that if a group of people are to be creative, they ought not to be given any structure. According to him, most groups find some structure quite enabling, such as receiving a well-defined task. However, 'sufficient freedom' is necessary to take initiative and be creative. Wiggins (1999:35) agrees that although educators should not place too much emphasis on the parameters of an assignment, establishing absolutely no parameters could be disabling.

Referring to the importance of choice for the cultivation of creativity and autonomy in students, Pintrich and Schunk (1996:249) also emphasized the notion of 'freedom within structure' (such as a broad theme or general curriculum requirements). They proposed lecturers should aim to provide opportunities for students to do different activities and choose their own topics within a range of activities that fit the main structure of the curriculum (Pintrich and Schunk, 1996:294). For example, in graphic design education, a typical 'structure' may imply that students are assigned to work within the theme of 'corporate identity' but are allowed to choose which design applications (e.g. a brochure, a logo or stationary) to create. Allowing students to choose activities that they engage in may contribute significantly to foster independence and creativity in students (Starko, 1995:259;

Houtz, 2003:208). Choice is also postulated to affect intrinsic motivation (and subsequently, creativity) as indicated by a number of research studies discussed in Chapter 3, section 3.4.

The allowance of more choice opportunities, the provision of psychological safety and the demonstration of trust and respect are all factors that signify an environment free from salient *controlling* constraints. Although this point has been demonstrated by Amabile's research on intrinsic motivation and creativity (section 3.2), a number of studies focused specifically on the effect of controlling environments on children's achievement and creativity. For example, in an examination of children's perceptions of their classroom climate, conducted by De Charms (in Houtz, 2003:203), he found that children who perceived themselves as 'origins' of their own classroom behavior (e.g. self-reliant, autonomous and responsible) were more creative than were children who perceived themselves as 'pawns' (e.g. under the control and direction of those in authority). In another field study listed by Houtz (2003:210), Ryan and Grolnick found that children with a high 'origin orientation' wrote more creative short stories on a school-related theme than did children with a low origin orientation. Extending this research, Picariello (quoted in Houtz, 2003:210) found that children with a high origin orientation were more intrinsically motivated and more creative in poetry and short-story activities. In short, the hallmark of an educational environment that supports autonomy seems to be an absence of a controlling classroom climate. Therefore, the recommendations made in Chapter 3 (section 3.3) to reduce extrinsic controlling events in the classroom in order to increase intrinsic motivation, may also have a positive effect on students' sense of independence.

In her discussion of the social-psychological factors that influence creativity, Amabile (1996:206-207) referred to a number of research studies that investigated the effects of 'open' classrooms on creativity. 'Open' classrooms are marked by an informal classroom climate, non-authoritarian teaching, a minimum controlling constraints such as grading and competition, variation within the curriculum and individualized instruction (therefore, a typically autonomy supporting environment). Using a variety of creativity tests, these researchers discovered a consistent superiority in creative ability of children in the informal, open classes. The studies included tests that measure fluency, flexibility and originality in children (Goyal's study), performance on open-ended design-making tasks (Mc Cormick's, Sheehy's, and Mitchell's study) and puzzle-solving abilities (Hyman's study) as well as storytelling. In this study, Sullivan found that open classroom children used more vivid language and greater variety in sentence structure. Considering the results of these studies, Amabile (1996:207) concluded that 'there is qualified support for the prediction that relatively informal, non-controlling classroom environments will facilitate creativity more effectively than traditional, restrictive classroom environments'.

In a study that was aimed at college students, investigating educators' lecturing styles that facilitate or inhibit creativity, Chambers (in Amabile, 1996:208) asked several hundred creative students to describe the teachers who had the greatest facilitating and inhibiting influences on their creative development. The results were compiled into two lists, one rank ordering the ten most important facilitating factors and another rank ordering the eight most important inhibiting factors. Facilitating factors (in order of importance) were: (1) treated students as individuals; (2) encouraged students to be independent; (3) served as a model; (4) spent a considerable amount of time with students outside the class; (5) indicated that excellence was expected and could be achieved; (6) enthusiastic; (7) accepted students as equals; (8) directly rewarded students' creative behavior or work; (9) interesting, dynamic lecturer; and (10) excellent on a one-to-one basis. Inhibiting factors (again in order of importance) were: (1) discouraged students (ideas, creativity, etc.); (2) was insecure (hypercritical, sarcastic); (3) lacked enthusiasm; (4) emphasized rote learning; (5) was dogmatic and rigid; (6) did not keep up with field; generally incompetent; (7) had narrow interests; and (8) not available outside the classroom. This study indicated that the two factors that were rated the *most significant factors* in facilitating creativity were the encouragement *individualism* and *independence* in college students. Accordingly, the number one inhibiting factor was the 'discouragement' of ideas – signifying a lack of tolerance, trust and respect for their ideas.

However, Starko (1995:272) notes that 'amid all the emphasis on independence, it is important that educators do not lose sight of the value of sharing creative activities and insights'. According to him, the classroom must be a 'democratic environment comprising of an interactive community of autonomous learners'. He notes that although not every creative person or product requires the same amount of social interaction, students should understand that sharing thoughts, experimenting together with ideas and asking questions of peers are important parts of individual creativity (Starko, 1995:274). He concludes: 'achieving a balance between autonomy and community is a delicate problem but an essential part of the creative process' (Starko, 1995:275). He also warns that independent students may not always be easy to teach - they may be stubborn, argumentative or resistant to authority (Starko, 1995:73). Nevertheless, if a classroom climate that signals trust and psychological safety (using Roger's term) is established, it may contribute to neutralize such defensive attitudes.

In summary, it seems that an educational environment that supports autonomy in students is characterized by psychological safety, trust and respect for students' individuality, a non-authoritarian, non-controlling, democratic classroom climate, while still ensuring a structured,

community orientated environment. A significant part of this 'structured environment' is the reality of evaluation procedures in education. Managing evaluation, grading and feedback to be supportive of autonomy, is an integral part of the deliberate fostering of creativity in students. The next section explores ways in which this could be achieved.

4.5 Evaluation procedures that support autonomy in graphic design students

The negative effects of reward systems, such as grading and evaluation, have been indicated by a number of studies cited in Chapter 3 which examined the relationship between intrinsic motivation and creativity (Amabile and Hennessey, 1992:60, Starko, 1995:254; Houtz, 2003:204). The significance of these studies for the fostering of autonomy in students, is that the detrimental effects of evaluation on creativity are largely contributed to the fact that individuals *feel controlled* when they are subject to evaluation (Amabile, 1992:60). These studies indicate that when students view reward systems (such as grading) as controlling their behavior, that is, they believe they are working in a particular way to earn the reward. They attribute their actions to factors outside themselves and lose their sense of self-determination (Pintrich and Schunk, 1996:275). As Jensen (1995:239) pointed out, grading is often used in education to 'bribe (control) students to perform'. Additionally, the research studies referred to earlier in Chapter 3 (Deci in Amabile, 1996:204; Koestner in Deci and Ryan, 1992:22) which directly investigated the effects of controlling events on creativity, confirmed that the experience of being controlled reduces the subjects' sense of freedom for creative expression.

However, according to Deci and Ryan's *Cognitive evaluation theory* (discussed in Chapter 3) the negative effects of evaluation do not apply when the evaluation is *non-controlling*, that is, when the emphasis is on providing informational feedback (Deci and Ryan, 1992:23). This type of feedback provides students with information about their work that helps them to work independently, such as positive competence feedback (Houtz, 2003:205). Informational feedback may also include information on how the creative process was managed, such as 'strategy feedback' referred to earlier (Starko, 1995:286). In controlling feedback, on the other hand, the teacher is the primary and usually the sole judge of students' success or failure (Starko, 1995:256). This type of feedback may include statements such as 'good work' or 'you can do better than this' or even, 'I'm disappointed in you'. These statements are regarded controlling because the teacher is the arbiter of good and bad, successful or not successful, valuable or not valuable. Such comments clearly let students know where they stand in the teacher's eyes but they do not, however, give students any information that will help them work autonomously. Wiggins (1999:36) observed that feedback that tends to be overtly critical and negative can give students the impression that they are doing creative

work for the teacher and not for themselves. She says this may cause students to lose 'ownership of the work'.

Although positive competence feedback tends to support autonomy, in some instances positive feedback can actually be controlling, especially when the feedback makes reference to the individual doing well in terms of what is expected by the educator (Houtz, 2003:205). Jensen (1995:233) warns that 'a positive judgment is still a judgment'. He recommends that students should rather be encouraged than praised to reduce the possible controlling nature of positive feedback with statements such as 'you're on the right track'. Another method to reduce control during feedback sessions is to purposefully ask students for their opinions, indicating that their opinions or ideas are valued and thereby stimulating their sense of independence (Petty, 1997:182). Still, reducing the controlling nature of feedback in education remains to be a complex problem. Even when educators succeed to reduce the external controlling nature of feedback, Deci and Ryan (1992:24) note that in certain instances, *internally controlling regulation* may occur. This type of internal control occurs when individuals hinge their own self-esteem on the outcome of evaluations. By having to perform well to feel worthy, the student may lose his or her sense of self-determination and intrinsic value for the activity. Ryan *et al.* (1992:169) notes that this is an important point theoretically, for it highlights the fact that just because an initiating or regulatory event is internal does not mean that the regulation is self-determined. Indeed, internal events can be experienced as controlling or de-motivating, in which case they will be antagonistic to self-determination.

Evaluation procedures are an inescapable reality of education. It may not be possible to eliminate evaluation in education, but as Starko (1995:252) points out, it should be possible to *manage* evaluation procedures to support autonomy in students. He believes the key factor to achieve this goal is to provide feedback and information on creative work without leading students to believe that the only valid sources of evaluation is outside themselves. Indeed, a central aspect in achieving autonomy in students appears to be self-evaluation. To escape the potential negative effects of external evaluation, Rogers (in Starko, 1995:252) also acknowledged that an internal locus of evaluation – the use of one's own judgment to determine the ultimate worth of a creative product – is crucial to sustain creative ability. However, Starko (1995:286) points out that just as students need to be taught how to self-regulate, as suggested earlier, they should also be *taught* to self-evaluate. Since individuals who produce creative products are often faced with skepticism and doubt about the quality or validity of their efforts, Starko (1995:289) argues that an important aspect of teaching self-evaluation is to help students develop objective standards for self-assessment. Products should not be rated 'good or bad' because 'I say so' or 'I like it', but because the product

meets some standard or accomplishes some objective. Students should learn to view evaluation as a tool for improvement, rather than an arbitrary or capricious judgment, either by the creator or an outside evaluator (Starko, 1995:290).

An important aspect of teaching self-evaluation is highlighted by Petty (1997:162) when he suggests that students must be taught to detach their egos from their work during self-evaluation. In order to prevent them from defensive approaches, Petty notes that it is imperative for students to understand that they are evaluating the *artwork* at hand and not *themselves*. He advises that when students view their own work, they should follow this approach:

It is as though someone else did the work for you, and you are deciding whether it comes up to your standard, and whether the work achieves what you want. You must have a no-blame policy about the mistakes and disasters you find. As failures are inevitable, they are hardly blameworthy. So your ego, rather than being attached to your work, must be attached instead to the vision of what the work will become. It must be confidently urging you towards what might be.

Although it is natural for students to seek reassurance, guidance and direction while they learn, they should learn to develop slowly away from this dependency towards self-evaluation (Petty, 1997:154). Petty's questionnaire that was referred to earlier, suggests that being 'approval centered' signifies low levels of autonomy. Jensen (1995:286) notes that when creative activity remains dependent upon external approval, students' creativity may be stifled, since they might 'do just what is required to receive the grades – nothing more'. This argument is appropriately illustrated by the metaphor of the maze and intrinsic motivation in Chapter 3 (section 3.1), indicating that an extrinsic focus caused by evaluation may cause them to pursue easier, less challenging approaches to the task (Deci and Ryan, 1992:70). As Starko (1995:281) phrased it, 'there is ample evidence that in education, we get *only* what we assess' (authors italic's). Thus, focusing exclusively on what is regarded to be the requirements to pass an assignment seems to be a controlling factor that may reduce the freedom of creative experimentation and exploration in students.

An approach to evaluation that is often used in graphic design training is the use of evaluation 'rubrics', listing the specified evaluating criteria, often including scales such as 'weak', 'good' or 'excellent'. The purpose of these is usually to set objective standards for evaluation and grading. Although Jensen (1995:293) does not discredit the merits of this approach entirely, he warns that unless *students help set the criteria* this form of assessment is still more of the same 'demanding' (controlling) approach that affects their autonomy. He strongly recommends that evaluation criteria should not be 'enforced' on students, but that students should be guided to formulate evaluation criteria for assignments on their own. In graphic design for example, this may imply that students do independent research as to

which criteria should be used for determining the success of, for example, a logo, a brochure or a website. In view of Amabile and Hennessey's (1992:63) research regarding the importance of choice for self-determination and Locke and Latham's study (in Isaksen *et al.*, 1993:296) on the advantages of personal goal setting, if students formulate (choose) their own evaluation criteria for assignments it may contribute to increase their intrinsic motivation, sense of autonomy and creativity.

Jensen (1995:295) argues that evaluation procedures that support autonomy in students should make assessment 'meaningful'. According to Jensen, meaningful assessment is done *both* by the teacher and the students, using criteria for mastery that have been agreed upon by both teachers and the students. This approach relates strongly to the definition of creativity that was formulated in Chapter 2 (section 2.1) for the purposes of this thesis. This definition states that the creative product should ideally be completed to the 'satisfaction of *all the major parties involved in the educational process* – thus including both the students and educators. This process echoes the importance of respect and trust for students' opinions, their individuality and their autonomy.

4.6 Conclusion

The research studies and arguments offered in this discussion suggest a strong relationship between autonomy, a sense of independence and creative ability. Autonomy seems to be marked by qualities such as individualism, non-conformism, self-determination, self-regulation, intrinsic motivation and an internal locus of control. Educational environments that aim to enhance creativity through higher levels of autonomy in students are characterized by a safe, democratic, non-controlling, non-authoritarian classroom climate that signifies trust and respect for students and places an emphasis on student input, informational feedback and self-evaluation. Creating an educational environment with these characteristics for graphic design training may - in synergy with the other strategies of the proposed Methodology - contribute significantly to sustain higher levels of creativity in students.

The interdependent relationship between autonomy and the first strategy of the proposed Methodology, namely the fostering of intrinsic motivation, has been outlined in this chapter. Likewise, is the experience of autonomy highly dependent on the third strategy, discussed in the following chapter, namely the cultivation of self-belief in students. The ability to perform independent judgment and self-regulation is exceedingly reliant on sufficient levels of self-belief (Petty, 1997:154). Mc Combs (2001:78) noted that there are direct ties between self-structures (what individuals think, feel and believe about themselves) and self-regulation. These links are discussed in the next chapter that introduces the third strategy of the proposed Methodology.

CHAPTER 5

SELF- BELIEF AND CREATIVITY

Introduction

This chapter illuminates the importance of self-belief as a prerequisite for creative ability. The chapter argues that it is an individual's optimistic belief in his or her creative potential that fuels the creative process with courage, determination, fearlessness and persistence. A simplified explanation of the underlying neurological processes that control human behavior and cognitive ability is provided. The purpose of the discussion is to indicate that a positive belief in one's capabilities results in neurological changes in an individual's brain which support the successful execution of a creative task. Cognitive strategies such as the use of constructive self-talk and visualization to address low levels of self-belief in students are introduced. The discussion is furnished with step-by-step guidelines to implement the strategies. It is explained how a positive self-belief in students leads to a successful psychological cycle that is conducive to creativity. The chapter highlights various dimensions of student-lecturer interaction such as feedback and evaluation procedures that could potentially affect students' belief in their own creative ability. Various educational strategies to enhance students' self-belief during feedback are addressed. The chapter concludes with guidelines to deal with the experience of failure as inhibitor of self-belief in the educational context.

5.1 Self-belief as prerequisite for creativity

In a review of numerous research studies on creativity, Eiffert (1995:5) observed that the one variable that most influences a person's creative expression and potential is a strong *belief* in their creative ability. Runco (1997:94) and Gardner (in Houtz, 2003:102) also refer to studies on personality traits associated with creativity, which affirm a strong relationship between creative abilities and positive self-belief in individuals. Commenting on the body of research on creativity and self-belief, Eiffert (1999:4) remarked: 'nothing – education, birth order, country of origin, brain dominance, profession or even genetics – influences our creative potential more than the belief in one's creative abilities'. According to Eiffert creative people think creatively because they *expect* themselves to be more creative. He stated: 'creativity is an attitude of expectation that realizes itself. A person's belief in his or her creative ability fosters its own growth and expression' (Eiffert, 1999:2). The findings of an empirical study published by Goldsmith and Matherly (2001:54) on American college students supported the generally accepted belief that self-confidence and creativity are positively related.

Mac Kinnon (1971:203) pointed out that a strong sense of self-belief is vital to sustain creative abilities, since being creative often exposes an individual to criticism and being questioned. If creative action is not supported by self-belief, one may not be able to persist in the face of criticism or failure. Commenting on creativity in the advertising industry, Marra (1990:94) notes that it is only the power of self-belief which sustains artists through the 'up's and downs' of the industry. He says individuals who believe in their own creative ability understand that negative states are transient and if they move through it, it shall eventually be replaced by positive outcomes. Van Demark (1999:76) agrees that high levels of self-belief are essential to overcome the typical adversaries that may be experienced by creative people, stating that 'creative risk-taking and speculating opens one up and sometimes makes one vulnerable to challenge, criticism, betrayal, being misunderstood and increased stress'. Edwards (2003:91) also asserted that 'if individuals have self-belief and trust their own abilities and judgment then they are prepared to take risks and persevere and this leads to success and the development of a creative drive'. Sternberg (2004:200) agrees when he says:

Creative people often find that their ideas are received poorly. I suspect that all truly creative people come to believe, at some time or another that they have lost most or all their external sources of intellectual and even emotional support. At these times, in particular, it is important that they continue to believe in themselves. If they lose this belief, they will find themselves with nothing.

Although the potential of self-belief to result in high levels of creativity seems almost 'magic' as Petty (1997:184) phrased it, several authors on creativity and human achievement explained that this magic quality is in fact the outcome of quite logical psychological and neurological mechanisms of the human brain (Groviè, 1992; Muller, 2001; Eiffert,1999). These authors postulate that when the underlying brain processes are understood, it is possible to consciously control them to sustain self-belief in creative abilities. The following section introduces certain functions of the human brain relevant for the maintenance of self-belief and indicates how these processes could be managed to sustain creativity in graphic design students.

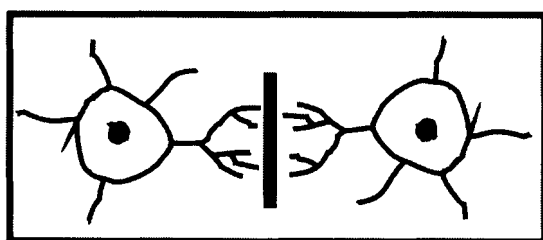
5.2 The implications of the neurological behavior of the human brain on creative ability

All human activity is ultimately a product of the organization of our brains and subject to its laws (Zeki, 2001:53). The mechanisms of the human brain are highly complex and it is not within the focus or scope of this chapter to provide detailed explanations of the underlying neurological processes that control human behavior. However, a rudimentary understanding of the way these processes may affect self-belief and creative abilities in students may be helpful to enable them to take conscious control of these processes in order to sustain their

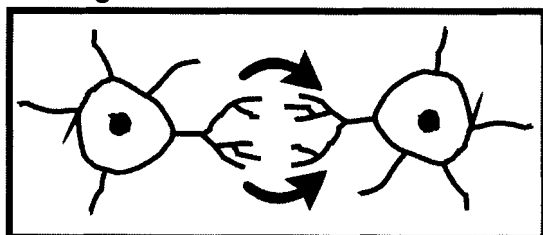
creative abilities. Indeed, those authors who described the neurological and psychological dimensions of self-belief in the context of creativity intended these (simplified) explanations to aid the conscious manipulation of brain-processes for higher levels of cognitive abilities. Grovè (1992:70) for example, believes that if an individual understands certain basic principles regarding the brain's neurological mechanisms, it could greatly enhance his/her ability to manage personal belief systems. Buzan (1991:28) also remarked that 'by understanding the brain's engineering and operations, one can better harness its power'. Guilford (1975:120) also asserted that students should be taught about the nature of their intellectual resources, so that they may gain more control over them.

Grovè (1992:70) explains that when an individual believes in his/her capability to perform a task, certain neurological changes take place in the human brain to support the successful execution of that task. According to Grovè (1992:71), when the brain receives a message in the form of a thought, such as 'I can' or 'I cannot', the electrical and chemical processes in the brain are literally programmed to fulfill the message. Thoughts are transferred in the brain from cell to cell through electrical impulses that create certain bio-chemical substances in the brain according to the positive or negative nature of the message. Thus, chemically and neurologically, thoughts 'program' the brain to fulfill the essence of the message received by the thinker. This mechanism is illustrated in Figure 4.

Figure 4: Simplified illustration of the bio-chemical processes in the brain, indicating how positive or negative thoughts 'program' the brain to fulfill the message (Grovè, 1992:71).



Message: 'I CANNOT'



Message: 'I CAN'

Figure 4 illustrates that a positive thought (such as 'I can') enhances the flow of certain bio-chemical substances in the brain that support the action contained in the positive thought.

Conversely, a negative thought (such as 'I cannot') 'blocks' the flow of the bio-chemical substances needed for a particular action and therefore tends to prevent the action. Remarkably, according to Grovè (1992:73), this process occurs even when the individual does not believe the message. She explains that when verbal or non verbal statements are repeated regularly, the brain accepts this information as 'true' and activates the same neurological processes as when an individual actually believes the information (Grovè, 1992:54). This ability of the brain to purposefully manifest thoughts (or verbal statements) into corresponding actions, partly explains the apparent 'magic' ability of self-belief to result in creative ability. Indeed, Petty (1997:185) observed that for those who believe in their abilities to be creative, high levels of creativity become self-fulfilling in an almost 'magical' way. Petty (1997:184) agrees with Grovè that 'part of this magic is the fact that self-belief has been shown to be self-fulfilling *even when the belief is entirely groundless*' (author's italics). However, Vance and Deacon (1995:20) warn that cultivating positive thinking should never involve denial of reality. Although they acknowledge the importance of positive thinking for creative ability, they emphasize that a positive attitude should result from realistic thinking and should not become a substitute for action.

When statements or thoughts are repeated regularly, the brain creates a neurological 'pattern' or a 'belief system' that bio-chemically supports the execution of the action reflected in the regular statements (Grove, 1992:53; de Bono, 1993:12). For example, if a student regularly repeats a statement such as 'I am weak at using watercolors' verbally or non-verbally, the brain establish this information as a neurological pattern that reduces the student's ability to work with watercolors. This neurological pattern is also known as a 'perception' (de Bono, 1993:12). The fact that the student *thinks* he or she is weak at using watercolors probably resulted from a number of failures using the medium, leading to the *perception* of inability (Grovè, 1992:55). Grovè (1992:54-55) explains that these 'patterns of perception' result from the way the right and the left brain handles information. The left brain tends to perceive information analytically, resulting in the formation of words or language when stimuli are received. Thus when we experience something – such as success or failure – the left brain 'labels' the experience using words such as 'I am good at this' or 'I am weak at that'. After an experience has been labeled, the right brain - which perceives stimuli more holistically - places this information into a more general 'automatic' brain pattern, resulting in a belief system or a 'perception'.

The primary function of these patterns – or perceptions - is to habitualize certain actions after being learnt, ensuring survival and leaving more thought energy for other essential tasks (Eiffert, 1999:19). For example, learning to tie shoelaces as a child may require painstaking effort, but over a period of time, the brain habitualizes this routine – or conditions through

habit – until it can be done effortlessly. The brain, now under control of the mind's programming, has organized itself around the pattern developed. The mind organizes itself toward rote and repetition and will not naturally seek out new patterns unless forced to do so. Without this tendency, one's awareness would be exposed to unlimited possible patterns and one would be overwhelmed with choices. Eiffert (1999:18) notes: 'the brain adapts itself to the world and at the same time it creates the world to which it is adapting. Therefore, through perception, we create our own realities'. This constant, re-adaptive process is what Edward de Bono (1993:10-11) calls a 'self-organizing system' (as discussed in Chapter 2). This self-organizing process of the brain, or pattern-making, determines the patterns we will see – not the patterns that exist (Eiffert, 1999:20). The process of shaping and enculturation creates a knowledge base and belief system in an individual that mirrors the circumstances in which it was created.

Grovè (1992:56) notes that the pattern forming behavior of the brain may lead to negative conditioning that could be debilitating to creative abilities. As it was illustrated in the previous example of the student who felt unable to work with watercolors, if he/she experienced a few failures in using the medium (which is a natural result of the learning process) the left brain 'labels' the experiences using negative statements. The right brain places this information on 'automatic', resulting in a habitual perception that tends to occur every time the student attempts to paint with watercolors. This perception may result in a creative block - the student *feels unable* to use watercolors successfully. As indicated in Figure 4, the student's brain has been 'programmed' bio-chemically to fulfill the message of inability at the stage when the negative message was 'labeled' by the left brain. Grovè (1992:72) concludes that 'negative brain programming causes failure'. Therefore, according to her, although the student may work hard to achieve success with watercolors, he/she has been 'programmed' to fail.

The implications of these facts for graphic design education are worth considering. Students who cultivate negative beliefs about their creative abilities could induce creative blocks and reduce their creative potential without being aware of it. However, there is also a positive side to the pattern-forming behavior of the brain. According to Grovè (1992:72-73), the pattern-forming behavior of the brain could be used to raise creative abilities. She points out that if destructive perceptual patterns are identified, they could be purposefully *changed* through the use of regular positive statements regarding one's abilities. As indicated earlier, even if an individual initially does not believe these statements, they will still activate the biochemical processes in the brain to 'program' the individual for success. Therefore, according to Grovè, self-belief in creative abilities could be deliberately cultivated if thoughts or statements that support self-belief are consciously repeated to produce a neurological pattern of self-belief in the brain. Through this process, destructive thinking patterns

(perceptions) that produce creative blocks may be purposefully changed to more constructive thinking patterns that support creative ability.

Since a perceptual pattern originates in the initial stages from a process where a language statement or a thought is labeled by the left brain, establishing a new pattern should start with a conscious change in *words* or *thoughts* (Groviè, 1992:77; Muller, 2001:34). Several authors have described the technique of repeating positive statements to purposefully create new belief systems in the brain (Muller, 2001:11; Eiffert, 1999:48; Silva, 1978:19; Vygotsky in Pintrich and Schunk, 1996:196). However, these authors have indicated that, in order for this technique to be effective, certain important guidelines should be followed. These guidelines could be summarized as follows:

- **Identification:** First, negative thoughts must be identified. Individuals are often not aware of their habitual thought patterns that limit them (Eiffert, 1999:29). Groviè (1992:57) advises that students should start 'listening to themselves'. It is essential to become consciously aware of negative thought patterns if one were to change them.
- **Substitution:** Secondly, the negative statements should be consciously replaced with more constructive ones. To be more effective, these statements could be written down and displayed to be prominent (Groviè, 1992:57). Eiffert (1999:45) refers to this process as 'mental substitution', suggesting that a negative thought should be substituted with a positive one the moment after it is identified. Groviè (1992:10) warns that due to the pattern forming behavior of the brain, some people may experience a resistance to the changing of habitual thought patterns. When exposed to new patterns the brain does not immediately recognize, it attempts to conform information to known patterns in order to increase the likelihood of recognition or understanding (Eiffert, 1999:20). Groviè (1992:57) suggests that when resistance is experienced, statements should be changed to be less radical, including statements such as 'I feel neutral towards watercolors' instead of 'I love or hate watercolors'.
- **Regularity:** In order to establish a new thinking pattern based on bio-chemical changes in the brain, it is required that statements and visualizations must be repeated occasionally throughout the day for a certain period (Groviè, 1992:58).
- **Present tense:** Statements should always be stated in the present tense, affirming that one already has what one is affirming, such as 'I have', 'I am', 'I possess', etc. (Eiffert, 1999:48).
- **Simplicity:** Eiffert (1999:48) suggests that affirmations must be kept simple, using short, clear language. According to Vygotsky (in Pintrich and Schunk, 1996:231) statements should reflect the typical style of 'inner speech' which is more economical than speech directed at communicating with others.

- **Body language:** Positive statements will be more effective if they are accompanied by positive body language such as upright shoulders and optimistic facial expressions (Grovi, 1992:83).
- **Avoid negative tenses:** Statements should preferably use active, positive language such as 'I am expressing'. Positive statements should not contain negative tenses such as 'I no longer' (Eiffert, 1999:48).
- **Visualization:** Grovi (1992:74) emphasizes the importance of visualizing the outcome of positive statements, creating vivid mental pictures of the results. Several authors on creativity have recommended and described visualization as a technique to improve mental and physical abilities. The potential of this technique is described in more detail later in this chapter.
- **Relaxation:** The results of re-conditioning are usually more effective if an individual is relaxed when statements or visualizations are made. In a relaxed state, the brain operates in 'alpha' waves which are the most conducive brain waves to assimilate and process auto-suggestions (Muller, 2001:11). Furthermore, if the brain is stressed, brain functions are minimized to focus on a survival mechanism known as the 'fright-and-flight' response (Grovi, 1992:78). In these conditions, brain activity is moved from the cerebral cortex, which deals with complex thought, to what is known as the 'midbrain'. This part of the human brain triggers basic physiological processes in times of stress to ensure the survival of the human species. Once this process has been triggered, complex brain activity is minimized. Conversely, in a relaxed state, the brain functions optimally. Although authors (Eiffert, 1999:50; Muller, 2001:46; Gawain, 2002:19) often promote lengthy relaxation exercises, Grovi (1992:57-58) suggests that while such exercises are ideal, it is often sufficient to simply breath deeply and relax muscles for a few seconds.

The procedure described above is related to Vygotsky's (in Pintrich and Schunk, 1996:196) notion of the self regulatory role of private speech that was the product of the unique circumstances existing in post-revolutionary Russia. Vygotsky (in Mc Caslin & Hickey, 2001:227) promoted the notion of self-instructional training procedures which extensively use private speech that initially is overt but through training becomes internalized. Mc Caslin and Hickey (2001:227) in their discussion of self-regulated learning in education note that 'the ready embrace of Vygotskian practices by Western educators shows that his notions are easily grasped and generally compatible with contemporary educational goals'.

Vygotsky was concerned with the multiple functions of semantic, meaningful language – what Pavlov termed the second signal system – and how this acquires two distinct functions: communication with others and self-direction (Mc Caslin and Hickey, 2001:230). At birth the

human infant is controlled by biology and the first signal system, the physical properties of the environment. Initially, the child reacts to words (the second signal system) not by their meanings, but by their sounds, that is, by their physical stimulus properties. As the child's language develops, words gradually acquire meaning independent of their stimulus properties. After repeated exposure to word meanings by other people in their social-instructional environments, children subsequently become able to expose themselves to word meanings and thereby direct their own behavior (Mc Caslin and Hickey, 2001:231).

The application of these principles to an educational environment such as graphic design education seems to require at least two strategies: first, the purposeful teaching of relevant principles and second, assistance in the execution of pattern-altering processes. Teaching may include:

- factual information on the underlying brain mechanisms associated with positive or negative belief-systems. It is essential that students should understand how their habitual thought patterns affect their brain neurology;
- procedural information on how negative brain patterns could be strategically altered, including the guidelines outlined earlier.

Assisting students to change limiting belief systems involves the purposeful identification of such systems (or perceptions) with the aim to replace them with more constructive ones, either using verbal, non-verbal or visualized statements. Ideally, instruction in these procedures should lead to self-regulation that includes the processes of self-observation and self-reaction outlined in the previous chapter on autonomy (Pintrich and Schunk, 1996:130). Eiffert (1999:9) asserts that the process of self-observation is of critical importance for the success of these methods:

If you aim to become more creative, you must begin to uncover limiting assumptions that constrict your expression. Learning to identify these limiting assumptions, many of which operate at an unconscious level, and challenging your thinking about them, is the most critical step in learning to express your higher abilities.

Eiffert (1999:29) even suggests that students use journals to record and reveal habitual thought patterns.

To demonstrate the ability of thoughts and visualization to make students move beyond their perceived limitations, Grovè (1992:97) suggests doing the following exercise in the class room. The exercise involves that students must lift their right arms and point their forefingers in front of them. They are then instructed to swing their arms backwards as far as they possibly can. The place where their pointing fingers stop is 'marked' with their eyes. Going back to the initial position, they are now instructed to close their eyes and visualize how their arms swings back and move *beyond* the initial point that was 'marked', at least a quarter of a circle further. In most instances, the student's arms will move significantly further than the

first time, illustrating the ability of thoughts and visualization to move beyond perceived limitations. Such a class room demonstration could help to motivate students to use constructive self-talk as a strategy to raise their creative abilities.

In his 2001 publication on visualization techniques, Muller (2001:9-13) pointed out that today visualization is an accepted technique in sport psychology. He provides several examples of athletes who accomplished significant results against all odds through visualizing their achievements. Ideally, visualization should be repeated regularly and accompanied with positive affirmations (Gawain, 2002:23). According to Grovè (1992:74) visual images or 'visual thoughts' created in the brain form actual neurological connections amongst the brain cells in the same manner that 'real' visual observations do. The fact that the brain cannot distinguish between fictional and real information has often been illustrated when a hypnotized person who is convinced that a pencil is a burning cigarette, develops a blister (Muller, 2001:10).

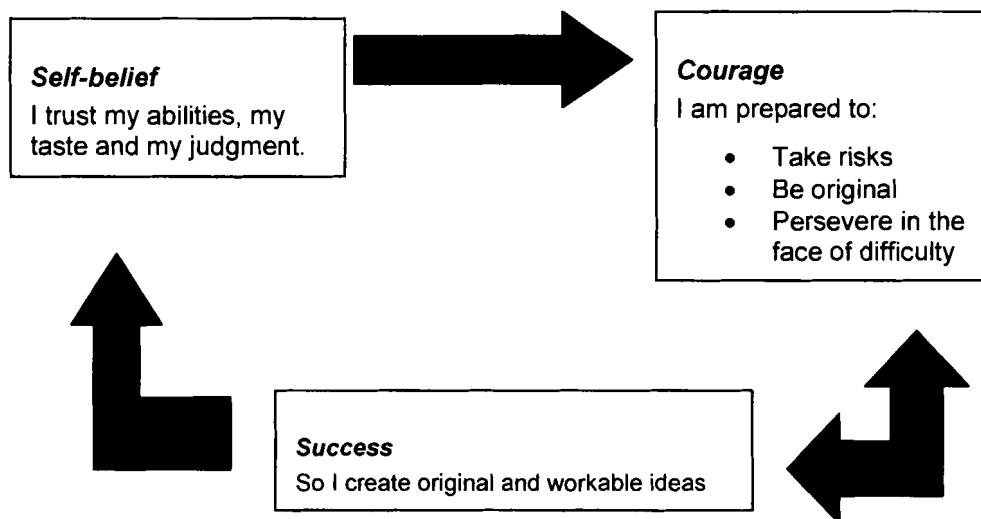
Although this popular example of the brain's abilities is extreme, the ability of visualization techniques to assist students in achieving their goals and increasing their self-belief should not be underestimated. For example, a graphic design student who feels unable to use a particular medium, may visualize him or herself achieving success with the medium, recalling successful examples from other visual sources. Grovè (1992:76) recommends using visualization to create an imaginative 'video' of one's success. Petty (1997:90) suggests that students should visualize their 'own positive mentors' who provide them with a constant flow of positive feedback, affirming their competence. Since the brain cannot distinguish between a real and an imagined mentor, receiving this imaginative positive feedback should raise students' self-belief and initiate more positive responses. Muller (2001:30-31) also recommended the use of imaginative 'advisors' to assist individuals in problem-solving. In this instance, different advisors could provide different perspectives on a problem.

In her book, *Creative visualization*, Gawain (2002) explains the process of visualization from a different perspective. She points out that thoughts are, just as matter, a form of energy (Gawain, 2002:8). On atomic and subatomic levels solid matter is a relatively dense compact form of energy and thought is a fine, light form of energy, or 'psychotronic' energy (Gawain quoted in Muller:2001:8). Gawain (2002:9-10) explains that energy of a certain quality and vibration tends to attract energy of a similar quality and vibration. A thought has its own magnetic energy that attracts energy of a similar nature. Thus, an idea or a thought creates an energy that tends to attract and create that form on the material plane. Gawain (2002:10) notes: 'an idea is like a blueprint; it creates an image of the form, which then magnetizes and guides the physical energy to flow into that form and eventually manifests it on the physical

plane'. Gawain's suggestion that certain thoughts result in certain actions is in accord with Grovè's (1992:56) earlier postulation that positive thoughts attract positive results and vice versa.

As students become aware of the fact that positive attitudes result in positive outcomes, they should be more likely to consciously choose more constructive thought patterns (Petty, 1997:184). Awareness of the underlying mechanisms that control behavior should make the cyclical nature of these processes more apparent. Observing that, in their own behavior, positive thinking leads to success and negative thinking leads to failure, could strengthen students' motivation to utilize strategies for change, either from a psychological or a neurological perspective. When teaching these principles to students, it may be useful to use a diagram (Figure 5) devised by Petty (1997:185) to illustrate the psychological dimensions of these cyclical processes. In his discussion on mindsets that are conducive to creativity, Petty explains that self-belief gives rise to a mental cycle that is conducive to creativity, encouraging people to take risks, be original and persevere in the face of difficulty. These qualities eventually lead to creative successes that once again strengthen self-belief, as illustrated in the following diagram.

Figure 5: Diagram illustrating how a positive self-belief leads to a successful psychological cycle conducive to creativity (Petty, 1997:185).



Although Petty approaches this diagram from a psychological perspective and not as Grovè, from a cognitive perspective, it is significant that this diagram acknowledges the importance of verbal or non-verbal statements, such as 'I trust my abilities' and 'I create workable ideas'. As it was explained earlier, essentially, the onset of a neurological pattern in the brain starts with self-talk (Grovè, 1992:55).

The experience of failure, whether it is with a particular technique, artistic medium or the outcome of an assignment in an educational context, is likely to trigger negative self-talk in some students. The experience of failure is likely to result in other failures (Deci and Ryan, 1992:14). Some social-psychological research studies confirmed the cyclical nature of failure to result in more failure. Seligman and his colleagues (in Deci and Ryan, 1992:14) conducted numerous studies of failure and inefficacy. In one study, subjects who performed an activity under conditions of unattainable outcome lost the motivation to perform effectively to such an extent that in subsequent situations in which outcomes *were attainable* they were less affective in achieving those outcomes. As Petty (1997:141) notes: 'A defeatist attitude is self-fulfilling. If you don't believe in a creative idea you will soon give up on it, so the idea fails because of this lack of commitment, long before any inherent weakness in the idea has proved fatal'. Grovè (1992:76) notes that when one fails due to a negative attitude, the negative belief gets *confirmed*. This confirmation once again leads to negative messages and the cycle is repeated. On the other hand, once a new thought pattern creates successful results, the successful information gets 'imprinted' in the brain to produce a 'successful' cycle (Grovè, 1992:39).

Gawain (2002:11) warns that although remarkable results have been achieved with techniques such as the use of regular affirmations and visualizations, it still requires true dedication to produce real change. Ideally – as noted earlier – these methods should aid self-regulation of creative abilities in students, involving important aspects of self-regulation such as self-observation. Mc Combs (2001:87) notes that motivation and self-regulation are *by-products* of self-belief. Personal self-belief systems play a critical role in how smoothly self-regulatory processes function – their effectiveness, efficiency, consistency etc. (Mc Combs, 2001:79). Indeed, as Petty (1997:162) notes, without high levels of self-belief, self-evaluation (which is an important part of self-regulation) is not likely to occur. The ability to perform effective self-evaluation is exceedingly reliant on positive self-belief. Phenomenologists assume that the ultimate source of motivation to self-regulate in education is to enhance or actualize students' self-concepts (Zimmerman, 2001:13). Students' perceived self-efficacy to create change, as well as their beliefs about the control they exert over desired outcomes, are both necessary for the enactment of self-regulated behavior (Paris, *et al.*, 2001:268).

The observations provided in this section illuminate the importance of self-belief as a prerequisite for creative ability. Although assisting students to identify and manage their thought patterns may be essential to ensure self-belief, other aspects of the educational environment may also affect self-belief in students. The next section indicates that various dimensions of student-lecturer interaction such as feedback and evaluation procedures could potentially affect students' belief in their own creative ability.

5.3 Sustaining self-belief in students during feedback and evaluation procedures

Although the previous sections primarily focused on *student* perceptions, research has indicated that positive attitudes in *educators* may also play a vital role in self-belief of students. Petty (1997:184) referred to a study by Rosenthal and Jacobson which illustrates the importance of educators' perceptions of their students' abilities. The researchers deliberately gave teachers false hopes of their pupils. They tested school pupils and pretended to their teachers that they were able to identify pupils whose abilities was about to improve substantially, passing the names of these 'improvers' over to their teachers. In fact, the names of these 'improvers' were chosen at random. When the researchers returned a year later objective tests showed that the IQ's of the 'improvers' had increased significantly in comparison with the IQ's of 'non-improvers'. Thus, the teachers' belief in their students' abilities, despite having no basis in fact, was self-fulfilling. This research has been repeated successfully many times with adults and with other children (Petty, 1997:184).

In his discussion on factors that influence creativity, Petty (1997:147) notes that 'ignoring the negative and focusing only on the positive may not be as dysfunctional as it seems'. To illustrate this point he refers to a study where researchers observed people learning how to bowl. One group of learners was told only of their weaknesses and the other group was told only of their strengths. The results of the study indicated that the latter improved their bowling much faster. It seems that if weaknesses are purposefully overlooked, stressing only positive aspects of performance, the weaknesses are resolved *automatically*. As Petty notes, learners will tend to find and correct weaknesses *unaided* if the emotional climate is positive and affirming. Additionally, in a study conducted by Vallerand and Reid (in Deci and Ryan, 1992:14) positive feedback was found to favorably affect subjects' perceived competence and intrinsic motivation favorably. Several other studies cited by Deci and Ryan (1992:13) confirm these findings.

However, several researchers and authors have warned that although positive feedback may be conducive to students' perceptions of self-efficacy, it is essential that students do not perceive the feedback as *controlling* their behavior. As it was pointed out in the previous discussions on intrinsic motivation and autonomy in students, Deci and Ryan's (1992:23) *Cognitive evaluation theory* (developed as a summary of research results on intrinsic motivation) holds that feedback, including positive feedback, may be experienced in various ways. It may be experienced as affirmation of one's competence without evaluative or pressuring overtones, in which case it would be labeled as *informational*. Alternatively, it may be experienced as an evaluation, as something that pressures one to think, feel, or behave in specific ways, in which case it would be experienced as *controlling*. Controlling feedback may lead individuals to hinge their own self-esteem on performance, called *internally controlling regulation* (Deci and Ryan, 1992:24). Deci and Ryan note that when students

believe their esteem is dependant upon evaluations of their performance, they are likely to feel controlled and to lose interest in the activity. Indeed, a study conducted by Ryan and Grolnick (in Deci and Ryan, 1992:31) indicated that subjects who perceived their classrooms to be more controlling had lower self-esteem than children who perceived their classrooms to be more supportive of autonomy.

Therefore, it seems that although the advantages of positive feedback for students' self-belief are clear, the focus should be on the provision of positive feedback of an informational nature. As mentioned earlier, positive feedback is experienced as informational if it affirms one's competence without evaluative or pressuring overtones. Pintrich and Schunk (1996:344) note that to be effective as a reinforcer, positive feedback or praise must be delivered contingent on performance of the behavior to be reinforced and be viewed by students as sincere and credible. Thus, positive feedback must not be given *regardless* of students' actual performance (Pintrich and Schunk, 1996:322). Providing positive ability feedback (e.g. 'you're good at this') when students have to struggle to succeed will not raise feelings of self-efficacy (Pintrich and Schunk, 1996:180).

If these guidelines are kept in mind, emphasizing the positive (even deliberately overlooking the negative), self-belief in students is likely to be sustained and mistakes should be more readily resolved (Petty, 1997:147). However, Petty (1997:162) notes that focusing on the positive during feedback sessions is a 'notoriously difficult mind-set since there is a natural tendency for deficiencies and weaknesses to shout down the strengths'. Although it is advisable to find a balance between being critical and being positive, Petty (1997:163) asserts that in most instances it is more effective to 'abandon the critical entirely and concentrate on the positive' to sustain creative ability. Discussing creativity in the advertising industry, Marra (1990:97) also suggests that in order to sustain creativity, 'more than anything else, the positive should be accentuated and the negative de-emphasized'. In Parnes' (1985:1) publication on effective facilitating techniques for creativity workshops (based on his well-known *Osborn-Parnes model for creative problem-solving*), he agrees that the 'ideal facilitator respects the potential of individuals, remains optimistic and always looks for something positive in a circumstance, idea or person'.

Although de-emphasizing the negative may be an effective strategy to sustain self-belief in students, in most educational situations, including graphic design, it is unrealistic to avoid negative feedback altogether. However, the potential damaging effects that negative feedback may cause to students' self-belief and creativity seem problematic. Ample evidence from research studies indicates the negative relationship between the experience of failure, negative feedback and self-belief (Deci and Ryan, 1992:14; Pintrich and Schunk, 1996:316).

In his discussion on factors that cause creative blocks in individuals, Hallman (1971:221) notes that any feedback or attitude that destroys feelings of self-worth in students have a tendency to block off creative efforts. These observations and all the emphasis on the advantages of positive feedback, raise questions regarding how the inevitable reality of negative feedback must be approached to sustain self-belief and creativity in students.

Pintrich and Schunk (1996:338) address this problem in their discussion on motivational issues in education. They suggest that the detrimental effects of negative feedback could effectively be counteracted if criticism is approached as *attributional* feedback. This type of feedback purposefully links student performance with one or more attributions (perceived causes of outcomes) in an attempt to facilitate motivation and protect self-belief in students. According to Mc Combs (2001:99) when attributions about the cause of outcomes are provided, perceptions of self-efficacy are likely to be raised. When the reasons for failure are attributed to controllable factors (e.g. low effort or improper strategy use) it signifies that failure does not result as a lack of ability in the student and self-belief is therefore not affected negatively (Pintrich and Schunk, 1996:338). The main purpose of attributional feedback is to protect students from feeling that *they* are failures, when their *work* fails. For example, in graphic design education, failure could be attributed to factors such as stress, being extrinsically motivated, incorrect time management or negative thought patterns. Even in instances when causes for failure include personal deficiencies such as laziness, irresponsibility or weak class attendance, it may be helpful to determine the underlying causes for this behavior.

Pintrich and Schunk (1996:314-315) notes that attribution theory is one of the few social cognitive theories of motivation that explicitly incorporates emotions into the motivation-achievement behavior process. According to this view, the attributions an individual makes to task outcomes can be categorized into three basic dimensions – locus, stability and controllability. Locus could be either internal (being personally responsible for failure or success) or external (due to a factor outside the self) (Pintrich and Schunk, 1996:316). Attributing an outcome to a stable cause will result in an expectation that the outcome will occur persistently in the future and could result in feelings of hopelessness, where attributing an outcome to an unstable cause (e.g. lack of effort or stress) will lead to an expectation that future outcomes could vary. The controllability dimension is related to personal responsibility (Pintrich and Schunk, 1996:317). If a cause is seen as controllable, the individual is deemed responsible, whereas uncontrollable causes generate a perception of less personal responsibility for the outcome. This view is related to what Eiffert (1999:40) calls the 'learned pessimistic perspective'. This perspective is marked by either personalization of an event ('why is this happening to *me*?') or pervasiveness ('this *always* happens to me').

As de Bono's (1993:12) theories of the pattern-forming behavior of the brain illustrated earlier, the dimensions of locus, stability and controllability as well as the perspectives Eiffert referred to, are not necessarily objective truths about the events. These are in fact *perceptions* based on a number of experiences. As explained earlier, perceptions are habitual brain patterns that results from recurrent thoughts or experiences. Therefore, perceptual patterns that result from failures or negative experiences may be based on 'irrational' thoughts such as the belief that one shall *never* be able to paint with watercolors (Groviè, 1992:68). De Bono (1993:60) refers to people's set of perceptions as a 'logic bubble', describing that personal bubble of perceptions within which each person acts in a totally logical fashion. As Eiffert (1999:30) remarked 'you do not see the world the way *it is* – you see the world the way *you are*' (authors italics). Indeed, from a phenomenological perspective, Mc Combs (2001:76) points out that a person's *interpretations* of events are more powerful determinants of actions than the events themselves. Therefore, it seems essential to assist students to realize that their perceptions of their own abilities are not necessarily true, but may be the result of the way they have been programmed 'incorrectly' through a number of positive or negative experiences.

Identifying limiting perceptions as a possible cause for failure is an important aspect of attributional feedback. If failure is attributed to a particular habitual thought pattern in students, it may help to convince them that when their assignments fail it does not indicate that *they* are failures, but that they fell subject to their own negative programming. Separating their egos from their work is an important differentiation for students to make if their self-belief in creative abilities were to be sustained (Petty, 1997:162). Petty notes: 'If students' egos are too strongly attached to their work, they will resent criticism and they will stunt their own and the work's progress'. Eiffert (1999:44) also notes that it is essential for students to learn to 'de-personalize' feedback or evaluation to sustain belief systems conducive to creativity: He suggests:

Eliminating the 'me' in your thinking is one method of shifting how you are thinking about a situation. Rephrasing your internal dialogue to, 'why is this happening?' instead of, 'why is this happening to me?' results in a less personalizing statement that often enables the mind to see opportunities instead of problems. Practicing this form of context shifting can be very effective in teaching you new thinking and feeling styles that reveal more constructive possibilities for creativity.

To sustain the differentiation between students' person and their work, Starko (1995:256) notes that value judgments should not be made about students as individuals (person-based feedback) using statements such as 'you can do better than this' or even 'I'm disappointed in you'. Essentially, person-based feedback is controlling in nature. Marra (1990:71) even warns against the use of affective words such as 'like' or 'dislike' in educators reactions to artworks. He says these words 'enter the realm of the heart as opposed to the head' and are

therefore more emotional and controlling than informational. Feedback should rather focus on the strengths and weaknesses of various aspects of their work (attributional and informational feedback). This type of feedback could also include 'process' and 'effort' feedback that addresses the strategies that students used to execute a task (Starko, 1995:285).

Starko (1995:250) notes that the way teachers treat failures in a classroom situation can significantly affect students' perceptions about their abilities. Teachers' reactions to students' mistakes can send strong messages about the nature of mistakes and their role in learning. Starko refers to two possible reactions that educators could have towards students' mistakes. Firstly, they could encourage the view that mistakes are indicators of a students' ability or secondly, they could encourage the view that mistakes happen to everyone regardless of ability and really represent an opportunity to learn. Petty (1997:142) advises that educators should cultivate 'responsive' reactions to failures in students instead of 'defeatist' attitudes. He notes that responsive students look for factors over which they have some control, for example technique, strategy, approach, circumstance, effort or persistence. When confronted by a problem, they change one of these factors and try again. Responsive students know that a 'failed draft is not a failed idea'. They *assume* that they will succeed in the end, it's just a matter of working out how. Petty (1997:143) asserts:

Responsiveness works. It is the only functional and emotionally intelligent approach to being more creative. Responsiveness is about turning circumstances to your own purpose and advantage; it is proactive. It is an invariable characteristic of creative and successful people.

Responsiveness as described by Petty echoes Eiffert's (1999:2) earlier observation, saying that 'creativity is an attitude of expectation that realizes itself'. Furthermore, it agrees with Grove's (1992:70-73) notion that positive belief systems lead to positive results. In sum, these observations affirm self-belief as a crucial variable in creative abilities.

5.4 Conclusion

The proposed Methodology is based on the premise that graphic design students must understand the variables that affect their creativity if they were to control these variables. Knowing that a lack of self-belief could significantly reduce their creative ability is the first step to a self-regulated process where graphic design students, based on an understanding of the underlying mechanisms of the brain, manage their own belief systems to become active participants in the maintenance of their own creative ability. Furthermore, if lecturers purposefully attempt to cultivate and protect students' self-belief during feedback and evaluation procedures, focusing on the positive aspects of their work and providing mainly attributional and informational feedback, it could contribute considerably to the maintenance of creativity in students.

CHAPTER 6

STRESS AND CREATIVITY

Introduction

This chapter investigates the negative impact that stress has on creative ability. A distinction is made between positive stress that is conducive to creativity and negative stress that is detrimental to creativity with reference to the conditions under which each type of stress is likely to occur. The notion of 'relaxed attention' is discussed with regard to its significance for creative ability. The neurological mechanisms that take place in the human brain during stressful conditions are explained. The discussion illustrates how creative ability is reduced when students function in a stressful environment. It is postulated that if students understand the manner in which stress affect creativity on a physiological and cognitive level, it may assist them to manage their stress levels to support their creative ability. Certain stressors that could potentially affect students' creative ability in the educational environment such as evaluation procedures, grading and feedback are identified and discussed. It is explained how these stressors may lead to creative blocks in graphic design students. Strategies to assist students to reduce stress in the milieu of graphic design education are outlined. The strategies include the implementation of music, play, humor and relaxation exercises in practical classes.

6.1 The impact of stress on creativity

The negative impact of stress on creative ability has been demonstrated by several studies and confirmed by numerous authors on creativity (Jensen, 1995:24; Houtz, 2003:30; Starko, 1995:256; Dacey and Lennon, 1998:120). Although a number of factors may be responsible for the negative impact that stress has on creative ability, the main explanation involves the fact that the human brain, under stressful conditions, tends to 'minimize' higher order thinking of the neo-cortex and resorts to using the survival-oriented part of the brain, the 'reptilian' brain stem (Jensen, 1995:23). This implies that complex brain activity (such as creativity) becomes significantly reduced when an individual suffers from fear or stress (Groviè, 1992:79). The process is generally known as the 'flight-and-fight response' and is discussed in more detail later in this chapter (Groviè, 1992:128).

However, authors on creativity generally agree that although excessive stress is detrimental to creativity, a certain amount of 'healthy' stress may be conducive to creativity (Houtz, 2003:30). Amabile *et al.* (1996:9) points to a few studies that have produced findings relevant

to the question of the effects of pressure on creativity in organizations. According to them, the evidence that does exist suggests seemingly paradoxical influences. Some research has found that, although workload pressures that were considered extreme could undermine creativity, some degree of pressure could have a positive influence if it was perceived as arising from the urgent, intellectually challenging nature of the problem itself. They conceptualize these findings as identifying two distinct forms of pressure, excessive workload pressure and challenge; the first should have a negative influence on creativity and the second should have a positive influence.

Jensen (1995:230) refers to studies published by researchers O'Keefe and Nadel that discovered that the body has 'positive stress' and 'negative stress' (or 'distress'). The positive forms of stress occur when individuals feel challenged and want to 'rise to the occasion'. In those instances, the body releases adrenaline and nor-adrenaline, which heighten perceptions, increase motivation and even enhance physical strength. Yet, the down side of adrenaline (which is essentially triggered by the fight-and-flight response) is that it can undo an individual's powers of concentration and memory if particular circumstances for 'positive stress' are not met (Jensen, 1995:230-231). The particular circumstances needed for positive stress to occur involve at least five conditions, namely when individuals feel they have a desire to solve a particular problem; when they have the ability to resolve a problem; when they have some control over a situation; when they experience sufficient rest between challenges and when they perceive a possible solution to a problem. The negative form of stress occurs when individuals feel stressed by some kind of threat, such as embarrassment, loss of prestige, being pressed for time or having lack of choice; when they feel helpless because they are forced to solve a problem they don't want to; when they don't perceive a solution to a problem; when they lack the resources to solve a problem and when they have unacceptable risk levels involved in trying to solve it or have little or no control over a situation (Jensen, 1995:230).

Finding the balance between the 'acceptable' amount of stress and the correct amount of relaxation that are conducive to creativity seems to be essential if creative abilities were to be sustained (Marra, 1990:92). A too relaxed person verges on lethargy and is not capable of higher order thinking skills (Mc Kim, 1992:267). Stress seems to become negative and detrimental to creativity when it is *excessive*. In his discussion of the creative process, Mc Kim (1992:263) describes the balance between alertness and calmness that are ideal for creativity as 'relaxed attention'. Relaxed attention refers to the equilibrium between just the correct amount of tension and relaxation that supports creative activity. Mc Kim (1992:267) notes that relaxed attention is free from 'chronic, excessive or irrelevant' tension. When these

types of negative tension are not present in an individual, attention is focused and energy is directed appropriately to the creative activity. According to him, relaxed attention is most suited to activities that include visual thinking (such as graphic design), stating that 'more than most human skills, seeing, imagining and drawing require relaxed attention' (Mc Kim, 1992:264).

Mc Kim (1992:268) also refers to this alert, but relaxed state as 'immersed attention' – a concept that is related to what Csikszentmihalyi (1990:48) calls 'flow'. This concept refers to a state in which people are so involved in an activity that nothing else seems to matter. It is marked by intrinsic motivation, natural absorption in the activity and deep enjoyment of a task. Flow is also associated with freedom to explore, examine, express and hence perpetuates curiosity and flexibility of cognition, leading to both playfulness and creative productivity (Houtz, 2003:103). When individuals experience 'flow', an optimal match between the challenge posed by the problem and their own skills are maintained (Csikszentmihalyi, 1990:48). Eiffert (1999:128) notes that when an athlete reaches a level of optimum performance, rather than maximum exertion, he or she seems to move into this almost meditative zone of *relaxed peak performance*. Starko (1995:260) stated that authors on creativity generally agree that this state of immersed attention which is free from excessive stress and marked by a relaxed, but alert mental state, is the condition most conducive to maximum creative ability.

Van Demark (1991:76) notes that creative individuals are usually sensitive people and are therefore more prone to stress. Research indicates that creative individuals are usually sensitive to interpersonal dynamics and show greater sensitivity to the emotional pressures of an environment than their non-gifted counterparts (Eiffert, 1999:255). Moreover, Eiffert (1999:22) notes that being creative is often stressful in itself: creative ideas frequently challenge established ideas, exposing the creative individual to possible criticism, disapproval or ridicule. He notes: 'the more unique and original our ideas, the more we can count on being challenged and likely to be criticized for them'. These observations are significant to the context of graphic design training due to the general probability of students' sensitive and artistic temperaments, which may be more prone to stress. It suggests that when teaching graphic design students, educators should be particularly aware of stress as a potential obstacle to creative abilities in students. Indeed, the context of graphic design is an environment that are characterized by several potential stressors such as the imposition of deadlines for creative assignments, fear of failure and criticism as well as anxiety due to evaluation procedures.

The majority of these stressors comprise one of the most fundamental blocks to creativity, namely *fear* (Van Demark, 1991:68). As van Demark noted: 'fear is a basic element in a number of categories of emotional blocks to creativity'. He argues that that fear and anxiety probably affect creativity more than any other emotion, stating that 'fear of failure, fear of authority, fear to risk, fear and doubts about our one's ability and fear of making a mistake can result in a serious diminution of an individual's creative ventures' (Van Demark, 1991:66). Simberg (1971:132) agrees that any form of fear, even if based on false perceptions, are a definite deterrent to creative activity and problem solving. He notes that when under pressure to perform, individuals often tense their minds and bodies in an attempt to focus on a goal or objective. According to Eiffert (1999:129) this intense condition usually creates 'inflexible mental, emotional and physical rigidity' that cause individuals to be non-receptive to the information and the creative possibilities that surround them. Furthermore, Jensen (1995:237) notes that anxiety increases stereotyped, low-risk behavior in students. He points out that fear for failure tends to cause them to 'play safe' and reduce their ability to push the boundaries of creative exploration. Moreover, when under pressure, creative individuals are likely to use the first idea that occurs to them, neglecting further exploration of potential ideas which are an essential requirement of creativity (Simberg, 1971:130).

Therefore, it seems clear that if creative ability in graphic design students were to be sustained, it is imperative for them to strategically manage their stress levels to avoid excessive negative stress and ensure conditions that support states of 'relaxed attention'. Part of this process implies the acquisition of a basic understanding of the manner in which their brain mechanisms react to stress, resulting in a 'minimization' of their creative abilities. It was indicated in the previous chapter on self-belief that if students *understand* how negative belief-systems affect their brain neurology, they might be empowered to consciously control their thought patterns for higher levels of creativity. Similarly, if graphic design students understand how their brain mechanisms react to stress, they may be empowered to purposefully resolve the stressful situations in order to improve their creative abilities. The main physiological reactions of the human brain responsible for the negative impact of stress on creativity are therefore explained in the following section.

6.2. Physiological explanations for the negative impact of stress on students' creativity

Creativity is in essence a cognitive activity. The ability to generate novel ideas, to control the various cognitive stages of the creative process and to think divergently is exceedingly reliant on cognition. When the physiological impact of stress on cognitive abilities in the human brain is examined, it becomes clear that creativity is significantly reduced in stressful situations. As in the instance of the previous chapter, which explained brain mechanisms

with regard to self belief systems, it is not the aim of this discussion to fully explore the complexity of the human brain with regard to the impact of stress on it. However, as it was mentioned earlier, a rudimentary understanding of the manner in which stress affect creativity on a physiological and cognitive level may motivate students to strategically manage their stress levels to support their creative ability.

Jensen (1995:21) explains that from a functional viewpoint, the human brain is regulated by means of three areas in the brain, derived from Paul Mac Lean's 'triune brain' theory: the *reptilian* brain (brain stem and cerebellum), the *mid-brain* (limbic area) and the *neo-mammalian* brain (cerebrum and neo-cortex). Mac Lean's theory proposes that each of these areas is responsible for a particular function of the human brain. Jensen (1995:21) notes that although the model is an oversimplification of the brain's functional processes, as a basic concept, the separate functions of each area are generally consistent with the 'triune brain' model. Of all these functions, the most primary function of the human brain is survival (Jensen, 1995:26). When the brain perceives 'alarm' or 'danger', the body reacts instantly through the *reticular activating system* (RAS) and sends a message to the adrenal glands, stimulating them for 'fight-or-flight' action (Dacey and Lennon, 1998:120-121). In these stressful conditions, brain activity is moved from the cerebral cortex, which deals with complex thought processes (such as creativity) to the reptilian brain, which triggers basic physiological processes at times of stress to ensure the survival of the human species (Groviè, 1992:78). When the stressful emotion subsides and one begin to relax, the RAS trigger switches one back into the more logical and creative cerebral cortex (Eiffert, 1999:81). Therefore, when an individual experiences stress higher order cognitive activity 'shuts down' to allow the instinctive fight-or-flight behavior mode to dominate (Eiffert, 1999:81). This process implies essentially that a person is *unable to think creatively under stressful conditions* (Groviè, 1992:80-81).

Jensen (1995:23) points out that when threatened, the brain ensures that higher-order thinking skills are set aside in favor of rote, 'tried-and-true' behavior which could support the survival of the individual. In stressful conditions, the hormone adrenalin is released from the adrenal glands that, amongst other physiological changes, speeds up one's heart rate, tenses muscles and prepares the body ready for fight or flight (Jensen, 1995:26). Survival-orientated processes always override higher order thinking. Jensen (1995:27) points out that stress is mainly an emotional experience and when the brain's neural structure is examined, it is evident that emotions are more important and powerful to the brain than higher-order thinking. He notes that there are a far greater number of the neural fibers that act as carriers of peoples' emotions extending *from* the mid-brain into the neo-cortex than there are going

from the neo-cortex *into* the mid-brain. This indicates that the brain, in order to ensure survival, places a priority on emotions over any other information.

Computer generated images show clearly that under threat, anxiety, negative stress and induced learner helplessness, the brain operates differently (Jensen, 1995:23). They indicate that under these conditions, there is an *increased* blood flow and electrical activity in the brain stem and cerebellum area (the reptilian brain) and *decreased* activity in the mid-brain and neo-cortex (that deals with complex thought processes). These computer images clearly indicate the minimization of the brain under stressful conditions. The notion that the brain minimizes during stressful situations has also been confirmed by studies that measures mental activity with PET (positron emission tomography) scan technology, indicating that people who were relaxed while problem solving, learning or engaging in any form of mental activity, utilized the largest areas of their brains in the process (Eiffert, 1999:130-131). Conversely, subjects in the study who were tense, anxious or concentrating too hard during the same activities used much smaller areas of their brains. Additionally, the study found that the relaxed group generated more and better ideas faster and with less conflict.

Jensen (1995:23) points out that these facts have tremendous implications for education. According to him, it implies that stress, threat and induced learner helplessness should be removed as far as possible from the learning environment to ensure cognitive ability in students. Jensen lists a number of conditions typical of an educational milieu (which are also likely to manifest in graphic design education) under which students' brains are likely to minimize. They include instances of intellectual threats (ideas being criticized or abilities questioned), when assignments are returned with derisive comments, when students lack resources to meet task requirements, when time schedules are unrealistically tight or when students are threatened by reward and evaluation systems. Jensen (1995:232) refers to groundbreaking research conducted by O'Keefe and Nadel which clearly indicates that under any type of perceived threat, the brain resorts to familiar 'tried and true' behaviors (thus avoiding novel, creative approaches to a task) and focuses on more automatic behavior. Indeed, reactions such as these could cause significant harm to graphic design students' creative abilities.

In essence thus, research on the impact of stress on the human brain holds that a relaxed mental state is conducive to creativity. This fact is also confirmed by studies that examine the type of brain wave patterns that is generated during various mental states. Using PET scan technology, it was found that during relaxed mental activity, subjects generate electroencephalogram (EEG) patterns called 'alpha' waves (Eiffert, 1999:130-131; Dacey and Lennon, 1998:199). When the brain is engaged in mental activity that requires alert attention,

the brain generates 'beta' wave patterns. 'Theta' waves are usually generated during deeper relaxation states such as hypnosis, deep meditation or semi-consciousness. While the theta state is often associated with creative incubation ('sleeping' on a problem), the relaxed alpha level of brain activity has been found to be the most conducive mental state for creativity (Muller, 2001:10). This state of 'relaxed alertness' is thought to facilitate intuition and inspiration, because it allows contact with the subconscious (Eiffert, 1999:167). Furthermore, research on a neurotransmitter, the adrenocorticotrophic hormone (ACTH) indicates that during alpha states, this hormone acts as a vehicle which aids communication between neurons in ways that are considered critical for the formation of new ideas (Dacey and Lennon, 1998:200).

Several authors (Muller, 2001:11; Eiffert, 1999:132; Petty, 1997:167) postulate that alpha states could be induced deliberately to enhance creativity through the use of relaxation techniques, listening to certain types of music or other relaxing activities. Employing such strategies to reduce stress in the educational milieu of graphic design may be valuable. Examples of such practices are discussed in section 6.4. The next section however, addresses a dimension of graphic design education that is considered as one of the primary stressors of the learning environment, namely evaluation procedures, grading and feedback.

6.3 Evaluation procedures as a stressor in graphic design education

Pintrich and Schunk (1996:308) indicated that the empirical research on the negative effects of anxiety on academic performance is quite large and consistent. Pintrich and Schunk (1996:308) point out that that research on evaluation anxiety has been ongoing since at least the 1950's. In fact, test and evaluation anxiety is regarded as such a primary problem in education that there is a professional organization devoted to research on test anxiety (International society for test anxiety research), as well as separate journals that are devoted to research on evaluation anxiety in education (e.g. *Anxiety, stress and coping: an international journal*). The effects of evaluation procedures on creativity have been studied from different perspectives. Amabile's research (discussed in Chapter 3 and 4) on intrinsic motivation and autonomy indicated that evaluation may negatively impact students' intrinsic motivation which could lead to a reduction in creative ability. Other studies published by Amabile (1983) on the social-psychological factors that influence creativity particularly examined the effects of evaluation or the expectation of evaluation on creativity. The results of these studies consistently indicated that evaluation reduces creative ability in subjects (Amabile, 1983:109-112). Although various reasons for the negative impact of evaluation on creativity could be provided (including its effects on intrinsic motivation), Amabile (1983:111) frequently verified through post-experimental questionnaires that evaluation raised subjects' anxiety levels during creative activities, contributing to a reduction in their creative abilities.

This was confirmed, for example, in a study where Amabile (1983:109-112) examined the effect of evaluation on forty undergraduate women's creativity while creating collages. Subjects in one group were informed that on the other side of a one-way mirror in the experimental room, four artists were waiting to watch subjects making their collages. These artists had supposedly been hired to make expert evaluations of their collage-making and their finished products, 'noting the good points and criticizing the weaknesses' (Amabile, 1983:110). In addition, the experimenter told the subjects that they would see these evaluations before they left the experimental session. Evaluation was not mentioned to another group. The artworks were assessed by 10 expert judges and results indicated that subjects who expected an expert evaluation produced significantly less creative work than subjects unconcerned about evaluation. When asked in a post-experimental questionnaire to rate the extent to which they felt anxious, evaluation subjects gave significantly higher self-ratings than did non-evaluation subjects. Additionally, evaluation subjects reported significantly more distraction while working than did non-evaluation subjects (Amabile, 1983:111). Amabile and her colleagues received similar results in several other studies that replicated the conditions of this study such as the studies conducted by Berglas, Amabile and Handel (in Houtz, 2003:206). Commenting on the body of research on evaluation and creativity, Amabile (1983:117) notes that even positive evaluation may undermine future creative performance because it leads to expectations of future evaluation.

In another study examining the effect of evaluation on children's creativity, Amabile and her colleagues (1992:62) told one group that upon completion of their computer design, they would receive a report card indicating how well the experimenter thought they had performed. Another group also expected to be evaluated, but they were told that the computer would determine how well they had performed and register their grades on the screen. For children assigned to a non-evaluation-control condition, no mention was made of a report card or evaluation contingency. Results once again indicated that the anticipation of evaluation significantly undermined creativity in subjects, regardless of whether the report card was expected to come from a human being or a computer (Amabile and Hennessey, 1992:63). Interestingly, most of Amabile's studies indicated that evaluation or the expectation of evaluation are in fact conducive to creativity on algorithmic tasks (where the path to the solution is clearly defined), but consistently appears to hinder creativity on heuristic tasks, where the path to the solution is not clearly predefined and needs exploration to solve (Houtz, 2003:206). As explained earlier, the latter involves more complex thought processes in the brain that are postulated to be negatively affected under stressful conditions.

Jensen (1995:283) in his 'brain-based' approach to education asserts strongly that students' brains do not learn or perform optimally in a classroom climate which places strong emphasis on evaluation and grading. He strongly recommends that grading should be de-emphasized, preferably reduced to an end of term event (Jensen, 1995:288). Jensen (1995:284) believes that students' creativity is enhanced in educational environments where constructive feedback abounds and grading practices are minimized, stating that the brain 'loves feedback because it depends on feedback for survival'. He notes that evaluation generally evokes two types of responses in students: firstly, their psychological anxiety of performance increases and secondly, they tend to feel insecure, since 'every reward (or grade) carries with it an implied certainty of success or failure' (Jensen, 1995:286). He points out that students who are anxious about the outcome of their creative endeavors, tend to reduce the uncertainty and resort to more predictable, less daring solutions to creative problems (Jensen, 1995:287). Students who work under the pressure of a grading system tend to 'play safe' by avoiding creative risks and narrowing their exploration to take easier, less challenging paths to a creative solution. In these instances, students tend to focus only on what is required to 'make the grade'. Jensen (1995:287) states that 'schools that focus exceedingly on grading and evaluation undermine sound educational practices and are ignoring critical and proven research about how students' brains function at best'.

Indeed, imbedded in the sense of uncertainty that could potentially result from evaluation procedures is a *fear of failure*. It was noted earlier that the fear of failure is generally regarded as one of the most debilitating blocks to creativity (Van Demark, 1991:79; Petty, 1997:148; Mc Kim, 1992:264). However, Vance and Deacon (1995:23) point out that being afraid of failure is not necessarily the same as being afraid to fail. They note that it is the fear of failure that often motivates people to try harder or use greater care. Conversely, the fear of failure does not need to create the fear to fail. Originality is achieved by continuous experimenting in which failure is part of the process. Vance and Deacon advise: 'be afraid of failure, but don't be afraid to fail'. Thus, as indicated in Chapter 5, teaching students to *accept the possibility of failure* and to view mistakes as an *opportunity for learning* seem to be two important mind-sets to cultivate in students if creativity were to be sustained (Van Demark, 1991:78). Starko (1995:250) notes that educators' responses to students' mistakes send strong messages about the nature of mistakes and their role in learning. The way in which educators treat students' failure in a classroom situation could determine whether students fear failure or whether they view it as an opportunity to learn. Starko notes that mistakes become stressful when viewed as indicators of ability and recommends that students should understand that 'mistakes happen to everyone regardless of ability'.

Petty (1997:148) notes that an important quality of a stress free classroom climate is an environment that signifies it is 'safe' to make a mistake, stating that in the creative process, 'weakness, is the stage before strength and does not need condemnation or contempt, but help and encouragement'. He notes that ideally, students should view evaluation as a 'safety net' that offers an opportunity to be affirming and positive about what works as well as an opportunity to learn and improve. To achieve this ideal it seems imperative that the focus in creative education, such as graphic design tuition, should be on the *learning process* and less on the outcome, reducing the pressure to perform in students. Indeed, Hallman (171:221) in his discussion on techniques to train creativity notes that that an *overemphasis on success* drains off energies from creative processes and focuses them upon outcomes. He states: 'such overemphasis blocks creativeness because it has the tendency to direct attention away from growth and from continual improvement'. Bull *et al.* (1995:89) investigated the course content of creativity courses in various disciplines taught at hundred and three colleges in the U.S.A. Amongst other prerequisites for creative ability, they reported that these institutions recommended that a *safe climate* should be established in the classroom whereby the students feel free to explore their creative potential.

These observations coincide with Roger's (in Starko, 1995:255) notions of 'psychological safety' (discussed in Chapter 4) as an essential requirement for creative ability. Rogers argued that an integral part of establishing a psychological safe environment for creativity to flourish is the absence of external evaluation. According to this theory, the pressure of external evaluation forces individuals to put up defenses and makes them less open to creative ideas. Rogers believed that an internal locus of evaluation, that is, the use of one's own judgment to determine the ultimate worth of a creative product, is the key to creative behavior. However, he clearly states that a lack of evaluation does not mean a lack of feedback or that outside evaluators cannot express opinions about creative efforts. Indeed, he notes that such opinions can be helpful, but it does mean that the final determination about the value of a creative effort is most powerfully and safely determined by the creator (Rogers in Starko, 1995:252). Rogers' theory of psychological safety describes several internal and external conditions that are required for creative ability. In general, these conditions reflect a stress free environment, placing emphasis on aspects such as acceptance of the individual, empathetic understanding, the ability to surrender to a playful attitude, enjoyment and intrinsic motivation.

Although it is acknowledged that an emphasis on feedback and a de-emphasizing of grading may be supportive to creativity, the manner in which feedback are provided by educators may play a significant role in its ability to manage stress in students. The previous chapters suggested various feedback strategies to ensure the maintenance of intrinsic motivation,

self-belief and autonomy in students. Several of these strategies may also be employed to reduce the potential stress that is associated with feedback and verbal evaluation sessions in graphic design education. For example, Deci and Ryan's (1992:23) *Cognitive evaluation theory* (in Chapter 3) which emphasizes the importance of *informational* feedback (as opposed to 'controlling' feedback) could help to make evaluation sessions less confrontational. Additionally, feedback which provide constructive information about the strengths and weaknesses of various aspects of students' work and purposefully avoid value judgments made about them (*person-based* feedback) are less threatening to students' egos and therefore less stressful (Chapter 5) (Starko, 1995:257). Furthermore, providing attributional feedback (also discussed in Chapter 5), which links student performance with one or more attributions that were responsible for an outcome (such low effort or improper strategy use), could rationalize evaluation sessions and reduce the stress related emotional reactions to feedback (Pintrich and Schunk, 1996:338). Clegg and Birch's (1999:97) recommendation to structure evaluation into listing positives and listing negatives separately could also make the whole process less emotive, less confrontational and more effective. They note that it is generally less stressful to list positive comments before listing the negatives, because then there is less defensiveness about the negatives.

Petty's (1997:147) suggestion (in Chapter 5) to focus primarily on positive feedback, deliberately overlooking the negative, (which he believes cause mistakes to be 'automatically' resolved) could significantly reduce the stress that is usually associated with evaluation. However, as was noted in Chapter 5, caution should be taken that positive feedback is not experienced as controlling behavior to perform, in which case it is likely to be experienced as stressful (Deci and Ryan, 1992:24). Jensen (1995:233) refers to Baumeister's research which verifies that 'heavy praise' given to a learner can be experienced as pressure to perform and result in performance anxiety. Baumeister's studies indicated that subjects who were given praise right before a creative skills test consistently performed worse than those who did not receive praise. Students in the study who were heavily praised became more tentative in their answers and gave up on their own ideas more quickly than those who were not. It seems therefore essential that positive feedback remains constructive, rather than providing excessive praise statements which may lack credibility (Pintrich and Schunk, 1996:344).

Jensen (1995:116) remarked that an integral part of training students to be more creative involves 'managing states'. Indeed, managing stress levels in graphic design students as a strategy to maintain their creativity implies a process where their emotional states should be managed to ensure maximum cognitive ability. Emotional reactions – as opposed to rational reactions to evaluation procedures - may be a major deterrent in students' creative ability. As

Jensen (1995:27) observed earlier, emotional responses overrides intellectual responses in the human brain to ensure survival. Eiffert's (1999:82) statement, which notes that an emotional response sets the 'pattern through which thinking will be filtered', confirms this fact. He reminds the reader that emotions are imprinted upon an individual's thoughts and ideas at the hidden limbic level of a person's brain mechanism. Eiffert argues that when one reacts to an event on an emotional level, one's focus is on the problem – not on the opportunity. He states: 'allowing emotion to undermine your creativity, you become *locked into a perception* that is masking the reality of creative possibilities' (Eiffert, 1999:85).

To sum up, this discussion illustrated that evaluation procedures may be an important stressor in graphic design education. When the detrimental impact of stress on creative abilities is considered, reducing the stress that is associated with evaluation seems to be an essential strategy to ensure maximum creative abilities in graphic design students. Although evaluation procedures are regarded as one of the primary stressors in the educational context of graphic design, students may also be exposed to several other stressors that are more difficult to manage. These could include pressing deadlines for assignments, low self-esteem and other personal situations that manifest itself outside the educational milieu. The next section offers a number of suggestions to assist students in individual stress management as well as techniques to ensure a general relaxed classroom climate that is conducive to graphic design student's creativity.

6.4 Strategies to manage stress in graphic design education

Stress in the educational milieu, whether it results from evaluation, deadlines or any other cause, is a reality that is difficult to avoid. Marra (1990:92) notes that creative activities are often *inevitably* marked by interchangeable phases of anxiety and relaxation. He advises that where stressful situations are a reality, these stresses should not be ignored but it should be accepted and managed. Therefore, providing students with the necessary knowledge to manage their own stress levels in a strategic approach to maximize their creativity seems imperative. Ideally, students should understand the negative impact of stress on their creative abilities and take purposeful action to control the internal and external conditions that are responsible for stress. While lecturers can do a great deal to reduce stress by providing a relaxed educational environment conducive to creativity, it remains essential that students are familiar with coping strategies for dealing with anxiety (Pintrich and Schunk, 1996:311). In his discussion of 'relaxed attention' as a prerequisite for creativity, Mc Kim (1992:270) notes that although relaxation techniques is often taught to athletes and performance artists, it is rarely taught in mainstream education. He argues that in view of the positive effects that relaxed attention has on thinking abilities, it should be regarded as an essential preparation to thinking, particularly visual thinking.

However, although relaxation techniques may be helpful to reduce stress in students, many of these techniques may require a fair amount of training and are too time-consuming and intricate for students to employ regularly in stressful conditions (Mc Kim, 1992:270). These techniques often involve lengthy sessions where muscle groups in the body are systematically relaxed while sitting or lying in a comfortable position (Groviè, 1992:149-160). Some of these techniques involve advanced meditation or visualization supported by certain breathing techniques, positive affirmations and relaxed music (Groviè, 1992:156). Although these practices may be valuable to those skilled individuals who are willing and motivated to sustain them, they are not likely to be used (ironically when they are needed the most) when students work under the pressure of time constraints and hectic schedules. Still, these observations do not exclude the validity of training and facilitation of more basic, less time consuming relaxation skills in the educational context. Mc Kim (1992:265-267) proposed a number of uncomplicated, less time consuming relaxation techniques aimed particularly to reduce the types of cognitive and muscular stress that is associated with creative activities.

Mc Kim (1992:263) notes that these techniques are specifically intended to induce 'relaxed attention', which is his term that describes the balance between alertness and calmness that are ideal for creativity. It aims to reduce 'chronic, excessive or irrelevant tension so that energy may be directed appropriately to creative task', as Mc Kim (1992:263) phrased it. It also intends to reduce stress that often results from working long hours in front of a computer or at a desk on creative assignments, involving relaxation of eye strain, neck and shoulder tension as well as the strain placed on arms and hands while creating artwork (Mc Kim, 1992:265). Mc Kim notes that neck and shoulder tension is a special problem for individuals who 'work with their heads'. The human neck was evolved for the flexible side-to-side and up-and-down head movements required for hunting and survival. Holding the heavy human head over a desk for long periods while looking rigidly straight at, for example, design work, is comparatively recent behavior that places an extremely unnatural demand on neck and shoulder muscles. He recommends that these areas should be relaxed periodically and always just before intensive mental or visual activity (Mc Kim, 1992:265). Indeed, the requirements of graphic design education often demand that students, pressured by time constraints (and often anxious about the outcomes of their work) must work for long hours in restrictive physical positions – conditions that could cause various forms of cognitive and muscular strain.

Full descriptions of the relaxation techniques proposed by Mc Kim (1992:265-267) are available in Annexure I. The following description provides a summary of these techniques,

indicating their most important functions and potential applications in graphic design education:

Technique 1: Stretching.

Purpose: General preparation before mental and visual activity or to reduce anxiety while working on creative assignments.

Procedure: The technique require a few quiet moments to detect muscle tension in areas of the body followed by slow, graceful stretching of the arms legs while breathing deeply.

Technique 2: Relax neck and shoulders

Purpose: After prolonged periods of working at a desk, table or on computer on a design, particularly at times when working is accompanied by anxiety.

Procedure: The technique involves circling and sideway movements with the head, pulling of shoulders in various directions and self-massaging of the muscles at the nape of the skull.

Technique 3: Relax arms and hands

Purpose: Before starting to draw or paint or after prolonged periods of drawing, painting or designing.

Procedure: The technique simply involves vigorous shaking of the hands and arms in various positions

Technique 4: Eye relaxation

Note: Mc Kim (1992:266) emphasizes the importance of relaxed vision to visual thinking. He points out that tired, strained eyes interfere not only with visual thinking but with efficient mental functioning. Computer work is especially taxing on eyes.

Purpose: To relax eyes at any time during the day and particularly after working on a computer or on intricate illustration/design work for a period.

Procedure: Eyes are covered for several minutes with the palms of ones' hands while consciously eliminating imagery and focusing on a uniform black field of vision.

Apart from these techniques, simply practicing deep breathing several times is an effective and quick way of releasing excessive tension (Mc Kim, 1992:266). Although Mc Kim's techniques mainly involve the relaxation of muscles, it is believed that when muscle tension is relieved it facilitates a reduction in psychological tension (Jacobsen in Mc Kim, 1992:264). Pintrich and Schunk (1996:308) point out that most theories of anxiety and in particular evaluation anxiety, distinguish between a *cognitive* component, usually called the 'worry' component and the affective or *emotional* component. The cognitive component refers to the cognitions that accompany anxiety, such as worrying about failing, thinking about the consequences of failures (such as parents being upset, having to drop out of college), worrying about being unable to meet a deadline, thinking about inabilities to accomplish a task and thinking about being embarrassed because of a low grade. The emotional component refers to the actual physiological and emotional arousal that individuals

experience in stressful situations, such as evaluation, as they take a test. While relaxation techniques are particularly effective to reduce physiological and emotional tension that is often associated with evaluative situations, Pintrich and Schunk note that other interventions may be needed to address the cognitive component of student anxiety.

Interventions that have been aimed at the cognitive component include direct study- and strategy skills training and cognitive behavioral self-regulation to control unwanted and distracting thoughts (Pintrich and Schunk, 1996:312). As far as the proposed Methodology for fostering creativity in graphic design students is concerned, 'strategy skills training' may include the cognitive and divergent thinking techniques discussed in Chapter 7. These techniques provide graphic design students with thinking strategies that are highly effective to stimulate creativity. Familiarity with these cognitive strategies could help to reduce stress levels associated with the creative process. 'Cognitive behavioral self-regulation' is related to the notion of positive conditioning that was discussed in the previous chapter. This strategy aims to deliberately replace habitual negative thought patterns with positive statements to facilitate self-belief in students. Grovè (1992:55) notes that students often inflict stress upon themselves when they regularly repeat a negative thought of inability. This process conditions the brain to result in an *automatic anxiety reaction* which occurs every time a situation arises that requires the student to employ a skill that is believed to be unattainable. Utilizing the strategies proposed in the previous chapter, replacing these destructive thoughts – which are often rooted in false perceptions – with more constructive thought patterns, could reduce the stress that results from negative perceptions. Most importantly, Grovè (1992:72) notes that positive conditioning is only effective when the individual is relaxed when statements are verbalized or visualized.

Assisting graphic design students to manage their stress levels through the use of relaxation techniques and cognitive self-regulation may be effective to facilitate higher levels of creativity. However, these strategies require a fair amount of motivation, co-operation and dedication from students to produce results. A stress management strategy that could be utilized in education with relative ease is the purposeful use of music in the classroom situation. Graphic design education is particularly suitable for the use of music since tuition often entails that students work for long hours in informal studio settings on practical assignments. Although more research is needed, several research studies confirm that certain types of music have significant abilities to reduce stress in individuals and simultaneously raise cognitive abilities such as memory, concentration and insight (Grovè, 1992:111-112). Grovè (1992:113) points out that our bodies resonate with music since the three basic elements of music is found in the human body: sound, rhythm and beat. Research found that music has the ability to lower people's heartbeat and blood pressure,

indicating more relaxed mental states (Groviè, 1992:112). Music has also been found to affect people's brain waves, often inducing alpha brain waves which are (as noted earlier) associated with relaxation, higher levels of creativity and an increase in cognitive abilities (Muller, 2001:10). Music is also postulated to elicit emotional responses by stimulating the limbic system, to activate the right brain and to 'energize' the brain (Jensen, 1995:218-219).

The types of music most conducive to cognitive abilities and relaxation are described as non-emotional, pattern-like and harmonizing music (Groviè, 1992:113). Charles Cave (1999) on his creativity website notes that most music with sustained tones and subtle variations including classical, light jazz, electronic, 'New Age' and instrumental music of various forms is conducive to creativity. He suggests that music with lyrics, music that demands one's attention and music with large, sudden changes in amplitude should be avoided. Although classical music is often believed to be ideal to stimulate creativity and other mental work, Cave (1999) notes that it is not necessarily the case. He says that classical pieces can be so fascinating and appealing (or non-appealing to certain individuals) that they can be distracting. However, certain Mozart compositions seem to be an exception. Jensen (1995:217) refers to research which found that subjects who listened to selected compositions of Mozart significantly improved their memory, reasoning and ability to think spatially. Additionally, in studies done on pre-schoolers, secondary level and college level students it was discovered that the computer-generated images of the brain activity had striking similarities to the written score of Mozart-composed music. Jensen speculated whether it could be that Mozart's music activates the brain in a way that humans are biologically receptive or programmed to think, but admit that more research are needed to confirm this.

Halpern (in Jensen, 1995:219), an American composer who studied the effects of music on the mind is convinced of the necessity of sound and music in education, arguing that the purposeful and well-planned use of music can positively impact learners. He says the benefits of music are threefold: firstly, since stress inhibits cognition, music could aid relaxation and stress reduction; secondly, music fosters creativity through brain wave activation and thirdly, music stimulates imagination and complex thinking. Jensen (1995:220) suggests that when music is used in an educational milieu, it must be used for a particular purpose. He recommends that educators should 'think about the specific physiological and emotional state that they would like to evoke in students and should then carefully choose the music that elicits that state'. For example, lively music could be used to create an informal, spontaneous and open atmosphere in the classroom (may be at the launch of a new project) and slow peaceful music could be used to facilitate relaxed states during practical studio sessions. Jensen (1995:221) also warns that too many musical sessions can create saturation to the listener, thereby losing its effectiveness. As a general rule, he

recommends that music could be included in thirty percent or less of the total learning time. Naturally, if students understand and experience the conducive effects of music on their creative abilities, they could use it on their own to facilitate lower stress levels higher levels of creativity.

The main aim of the purposeful and strategic use of music in an educational context is to facilitate in students relaxed mental states which are conducive to creativity. Indeed, the importance of relaxed states for creativity is often acknowledged by authors who emphasize a *playful* attitude during creative activity (Hallman, 1971:221). Several theorists have proposed that play (and the social conditions that facilitate play) can have beneficial effects on creativity (Amabile, 1983:180). Hallman (1971:221) notes: 'innovation requires freedom to toy with ideas and materials, encouragement to deal with irrelevancies and permission to dip into fantasy and make-believe - creativity is profound fun'. Petty (1997:69) observed that playfulness facilitates enjoyment of the creative process and therefore encourages maximum exploration of creative ideas. Amabile (1983:180) also suggested that creativity is enhanced by intrinsic motivation which is essentially marked by an approach of 'intellectual playfulness'. She notes that several theories of play propose that playful activity enhances flexibility and novel adaptation. Gordon (in Amabile, 1983:181), who initiated the popular creativity-training program 'Synectics', asserts the essential role of play in the creative process by saying that 'not all play is creative, but all creativity contains play'. Essentially, a playful approach to the creative process signifies a relaxed approach to creativity. It affirms the encouragement of play as a strategy to enhance creativity and reduce the stress that is often associated with the creative process graphic design students undergo.

The emphasis that is placed on play for higher levels of creativity is related to the emphasis that is often placed on humor as an aid to creative thinking. Many theorists have suggested a close association between creativity and humor, pointing once again to the benefits of a non-serious, non-stressful approach to creativity (Amabile, 1983:179). Amabile confirms this link by stating that the description of the necessary conditions for humor is remarkably similar to theoretical descriptions of the necessary conditions for creativity (e.g. to be 'free from the constraints of rational thoughts and decisions'). Koestler (in Amabile, 1993:179), who did extensive research on the benefits of humor for creativity, includes humor with science and art as the three basic areas of creative thought. Indeed, de Bono (1993:12-15) in his explanation of how creative ideas are formed in the human mind theorized that creativity and humor arises from the same brain processes (described in Chapter 2). He explains that both humor and creativity (or 'lateral thinking' as de Bono phrases it) originates from a shift in perception that deviates from the normal perceptual patterns of information in the brain (de

Bono, 1993:15). The term 'lateral' refers to moving sideways across the information patterns of the brain instead of moving along them as in normal thinking (de Bono, 1992:14).

Koestler (in Couger, 1995:238) notes that language reflects the relationship between humor and creativity: the word 'witticism' is derived from 'wit' in its original sense of ingenuity, inventiveness. Indeed, Getzels and Jackson (in Amabile, 1983:179) found that a keen sense of humor was one of the most important features distinguishing highly creative adolescents from those who were less creative. Similarly, in a study (conducted by Treadwell in Amabile, 1983:179) that examined the impact of humor on creativity, a positive correlation between creativity and sense of humor in college undergraduates was found. In this study, students listened to a recording of a popular comedian before completing some sections of the *Torrance tests of creative thinking*. Although there was no direct connection between the comedian's material and the test requirements, students who had listened to the recording scored significantly higher on fluency, flexibility and originality (Torrance's hallmarks of creativity) than students who had not. The results suggest that prior exposure to humor may be conducive to creativity, possibly due to its relaxing effects on the brain (Amabile, 1983:179). Wycoff and Pryor (2003:35) notes in their article on research that investigates the relationship between creativity, humor and cognitive processing, that humor tends to set the mind into modes of thinking that are investigative, seeking, grasping and filled with trial-and-error.

Dacey and Lennon (1998:123) notes that humor is a simple and often overlooked aid in stress relief. Research found that laughing produces a surge of endorphins in the brain (which are also produced when alcohol enters the body) and have a calming effect on a person for an average of thirty-six hours (Dacey and Lennon, 1998:124). Research also found that that the body reacts bio-chemically to laughing which boost the body's production of the neurotransmitters needed for alertness and memory (Jensen, 1995:112). Therefore, it seems that the beneficial effects which humor has on creative ability are twofold: it *relaxes* the brain while it simultaneously *stimulates* the brain (Couger, 1995:238). From an educational viewpoint, the use of humor as a strategy to enhance creativity in graphic design students seems considerable. Indeed, Daniel Couger (1995:238), the director of the *Center for research on creativity* at the University of Colorado notes that he uses humor continuously in creativity training workshops to generate an atmosphere of openness and relaxation. Including humor as a strategy to facilitate low stress levels and creative ability in graphic design education may include various forms, such as the use of humorous videos at particular times, humoristic quotes in study guides, displaying humoristic notes against the walls of the classroom or even inviting students to dress humorously for certain classes. Such interventions may help to keep the classroom climate light hearted and stress-free to ensure maximum creativity in students.

Besides the use of the strategies proposed in this section to manage stress in the educational milieu, other mechanisms, such as instruction in time management and devising realistic time schedules for assignments may also be crucial interventions (Amabile *et al.*, 1996:4). Education often necessitates the imposition of deadlines for creative assignments which may be a significant stressor for students. As illustrated earlier, when students work under pressure of deadlines, they may experience negative and excessive stress which may 'minimize' their brain capacity and reduce their ability to think creatively. The sense of inability that is caused by brain minimization may trigger even more anxiety, often resulting in a creative block. Petty (1997:118) notes the importance of enough time when individuals do creative work, stating that 'it takes an unhurried mind-set to step back from a piece of work and determine what exactly are you trying to achieve'. Driver (2001:30) also pointed out that creativity in the workplace depends on employees' having the proper resources, such as adequate time for creative ideas to develop. Likewise, Cave (1999) notes in his discussion to the obstacles to creativity that creativity is hampered by a 'too hectic environment that does not provide quiet time for reflection and introspection'.

6.5 Conclusion

The theories, studies and views expressed in this chapter strongly assert the importance of an educational environment which is free from excessive, 'un-healthy' stress if creativity were to be sustained in graphic design students. Essentially, it seems imperative to ensure that students understand how stress affects their creativity cognitively, behaviorally and psychologically. When they know the relationship between their creative ability and their stress levels they may utilize several of the strategies proposed in this chapter to control excessive stress. Managing their stress levels deliberately as a strategic approach to enhance creativity implies a self-empowerment process of self-regulation which has been shown in Chapter 4 to be essential for creative ability. Indeed, the discussion on stress and creativity illuminates the interactive dependency of the various social-psychological strategies of the proposed Methodology for fostering creativity. Students who are intrinsically motivated (Strategy 1), autonomous (Strategy 2) and believe in their own creative ability (Strategy 3) are likely to be less prone to anxiety and stressful conditions in the educational environment.

In addition, the cognitive strategies proposed in Part 2 of this thesis may further contribute to lower stress levels and enhance aspects such as autonomy and self-belief in students, pointing once again to the interrelatedness of the strategies in the proposed Methodology. These cognitive strategies aim to provide students with thinking techniques conducive to idea generation and the general management of the cognitive aspects of the creative process. Creativity is expected to be significantly enhanced when the cognitive and the social-

psychological strategies are combined in one comprehensive Methodology for the deliberate fostering of creativity in graphic design education.

PART 2

PROCESS-AND PRODUCT-RELATED STRATEGIES FOR THE FOSTERING OF CREATIVITY IN GRAPHIC DESIGN EDUCATION

CHAPTER 7

DIVERGENT THINKING TECHNIQUES

Introduction

This chapter introduces a repertoire of divergent thinking techniques to the context of graphic design education that may be used to stimulate and maintain creativity in students. Certain principles that underlie divergent thinking are discussed with reference to their importance for effective idea generation. The following idea generation techniques are described in the chapter: Random Association; Morphological Synthesis; Metaphors and Analogies; Mind-mapping; Idea Checklists; Visual Thinking and Sense Connections. Each technique is described in terms of its methodology, advantages, creative potential and its applicability to graphic design. Examples that demonstrate the technical execution of each technique are provided. A standard graphic design problem statement is devised to be used in these examples. Guidelines for the effective use and implementation of the techniques in the context of graphic design education are outlined. The chapter concludes with an indication of how the techniques could help to foster the social-psychological prerequisites for creativity that are addressed in earlier chapters.

7.1 Principles that underlie divergent thinking

The concept of 'divergent thinking' was initiated in the 1950's by J. P. Guilford's (1967a) influential *Structure of intellect* theory. This theory resulted from his famous twenty year study entitled 'The Structure of the Intellect' which findings dispelled the notion that intelligence was based on the abilities measured by most of the existing intelligence tests (Guilford, 1970:69; in Mac Kinnon, 1992:76). His theory holds that the intellect consists of five types of mental operations, which include divergent thinking, convergent thinking, cognition, memory and evaluation. Guilford *et al.* (1968:155-164) defined divergent thinking as 'thinking in different directions or searching for a variety of answers to questions that may have many right answers'. Divergent thinking is therefore normally employed to solve open-ended creative problems which may imply a variety of solutions – such as the type of problems which is typical to graphic design. Convergent thinking on the other hand is regarded as the

opposite of divergent thinking. It places a premium upon logical analysis and reasoning and involves thinking that selects the right or most appropriate answer to a question. It is typically used to evaluate the potential solutions after divergent thinking has taken place (Mac Kinnon, 1992:75). Although all five operations are involved in creative thinking to some extent, Guilford (quoted in Mac Kinnon, 1992:76) believed that divergent and convergent thinking are central to the creative process. Divergent thinking is essential in generating a wide range of ideas and convergent thinking is used to identify the most useful or appropriate of the possible solutions that the thinker has produced.

As part of his *Structure of intellect* model Guilford (1970:70) identified four skills which are associated with divergent thinking. These four skills are regarded by several authors as the hallmarks of creativity. Guilford described these skills as follows:

- fluency: the ability to produce a large number of ideas with words or figures;
- flexibility: the ability to produce a variety of kinds of ideas, to shift from one approach to another or to use a variety of strategies;
- originality: the ability to produce ideas different from the obvious, commonplace, banal or established;
- elaboration: the ability to develop, embroider, embellish, carry out or otherwise elaborate on ideas.

Aiming to achieve these skills, training in divergent thinking techniques has been recognized by several authors (de Bono, 1993:55; Michalko, 1998a:6, Couger, 1995:119; Starko, 1995:193; Marra, 1990:137; Petty, 1997:76) as one of the most fundamental components in the pursuit of the deliberate stimulation of creativity.

Most of the techniques discussed in this chapter as strategies for inducing creativity in graphic design students are essentially based on divergent thinking. They aim to 'divert' habitual thinking processes to stimulate the production of a variety of new perspectives to a given problem statement (de Bono, 1993:15). The inception of many of these techniques owes their conceptual frameworks to the pioneering work of Alex Osborn (1992:4) who pioneered the notion of 'brainstorming'. Osborn, often referred to as the 'father of creativity', was a firm believer that creativity is not an innate talent, but something that could be induced deliberately if certain thinking strategies are employed (Parnes, 1992b:x). In his revolutionary article entitled *How to think up* (Osborn, 1992:4) he described the technique of brainstorming and formulated two basic principles for the effective and deliberate generation of innovative ideas. Although these two principles were initially meant for brainstorming, they are today still regarded as fundamental to the execution of most divergent thinking techniques (Marra, 1990:97).

The first principle involves the deliberate *deferral of judgment* during the process of idea generation. It is based on the belief that a judicial mind inhibits and blocks creativity and these blocks need to be purposefully removed to allow creative ideas to flow (Osborn, 1992:11). Deferring judgment until a later stage relieves someone of the responsibility of evaluation and encourages individuals to allow ideas to flow freely without reservation or consideration of the appropriateness thereof. The 'no evaluation' rule encourages participants to suspend their natural urge to criticize, edit or censor the ideas. Evaluation can come later, but the notion here is that solutions will flow more easily if people are not assessing even as they articulate them (Brown, 2004:699). Osborn (1992:11) believed 'the wilder the ideas the better, for it is easier to tame down an idea than to think it up'.

The second principle holds that *quantity breeds quality* and originates in associative psychology, which assumes that thoughts or associations are structured hierarchically (Michalko, 2003a:54; Stein, 1974b:29). The most dominant thoughts in this hierarchy are those which are the most habitual or common and are therefore likely to be the 'safest' most acceptable ideas. These 'safe' ideas usually occur first in the idea generating process. Osborn postulated that it is necessary to 'move through' these conventional ideas to produce numerous other ideas if one were to arrive at original concepts. Implicit in this view is the notion that somewhere in the repertoire of an individual's associations there are some ideas and concepts that, due to their unconventionality, may be used as original solutions to problems. Indeed, findings in advertising research tend to support the notion that the more ideas one can generate, the better the probability for finding an effective creative idea (Marra, 1990:98).

These two principles are closely related to each other since the process of deferring judgment tends to 'push boundaries' to move beyond initial ideas and therefore helps to ensure the production of large quantities of ideas (Marra, 1990:98). Michalko (1998a:88) suggests that the 'secret' to deferring judgment while generating ideas is to separate one's thinking into two stages: possibility thinking and practicality (convergent) thinking. Possibility (or divergent) thinking is aimed at the generation of every conceivable possibility which may be used to solve a creative problem. He points out that several geniuses of the past employed this strategy, for example Edison who once declared that he constructed three thousand different theories about electric lighting before he decided on the one theory that was the most practical (Michalko, 1998a:89). To ensure the production of a large quantity of ideas, Michalko also recommends that individuals should decide to generate a predetermined quota of ideas (e.g. forty) to force them to think further than they would naturally do.

Traditionally, the technique of brainstorming is executed in a group with a facilitating leader who ensures that certain rules are adhered to (Osborn, 1992:11). However, Osborn (in Stein 1974b:36) acknowledged that 'despite many virtues of group brainstorming, *individual* ideation is often more usable and can be just as productive'. De Bono (1995:12) also asserted that 'creative techniques can be used in a powerful way by individuals working entirely on their own'. Indeed, several research studies which examined group versus individual brainstorming confirm this fact (Amabile, 1983:143; Starko, 1995:199-200). The belief that groups are more productive than individuals has been referred to as 'the illusion of group productivity' (Paulus quoted in Starko, 1995:199). De Bono (1993:x) criticized the 'scatter gun' approach of traditional group brainstorming, referring to it as 'old-fashioned and inefficient'. He firmly believes that there is no need for creativity to be a group process as in the case of brainstorming and argues that individual use of 'systematic techniques' - such as the lateral thinking techniques - could be more effective to generate creative ideas. Still, despite these criticisms, the principles that originated with the notion of brainstorming, namely the deliberate deferment of judgment to ensure the production of large quantity ideas, seem to be fundamentally important in the execution of these techniques (Marra, 1990:97; Michalko, 1998a:88).

The next section proposes a range of divergent thinking techniques which may be used in graphic design education to deliberately stimulate creativity in students and assist them to increase the quantity of their ideas. Although most of these techniques could be used individually by graphic design students, some techniques also have potential to be used as group exercises in a classroom situation.

7.2 Divergent thinking techniques proposed for application in graphic design education

Osborn's work formed the foundation for many creativity enhancement programs that are still used widely today (Parnes, 1992b:2). Apart from brainstorming, he pioneered techniques such as the use of an 'idea checklist' (discussed later in this section) and the well-known *Osborn-Parnes model for creative problem-solving* (discussed in Chapter 2, section 2.3). The decades following Osborn's work witnessed a great emphasis on the development and refinement of creativity techniques with a cognitive approach. Many of these are listed on the Internet (as indicated in Annexure D, Chapter 2). These websites generally facilitate creative thinking through the use of guidelines, examples or descriptions of various divergent thinking techniques. The effectiveness of many of these techniques to induce creativity has been proved by several research programs published over the past decades (Runco, 1997:95). All of these techniques employ systematic thinking strategies that are designed to overturn habitual thinking patterns in order to stimulate the germination of new thinking patterns.

These thinking strategies are often compared to 'tools in a workshop' that are devised to aid the thinking process in such a manner that creative ideas are likely to be stimulated (de Bono, 1993:284). In general, the methods and techniques that were developed to stimulate creative thinking could and have been, applied universally across a broad spectrum of disciplines such as architecture, script writing or business management. This section illustrates however, that a number of these techniques could also be employed effectively in graphic design education to stimulate creativity.

Most of the divergent thinking techniques require that a creative problem needs to be summarized in one concise *problem statement* which captures the main significance of the problem (Clegg and Birch, 1999:32). This statement summarizes the key issues of the problem and is used to identify the major aspects and concepts relevant or significant to the solution of the problem. To facilitate a better understanding of how these techniques may be applied in graphic design, a 'standard' (fictive) problem statement which resembles a typical graphic design framework is devised to be used as an example in the description of most of the techniques. This problem statement is kept simple and straightforward, yet flexible, to facilitate the most direct way of explaining the techniques. The standard problem statement is formulated as follows:

Conceptualize an idea for an advertising campaign which includes a name, a logo and a slogan for a sea-side company who offers scuba diving courses, facilitates diving excursions and sells diving equipment.

This problem aims to demarcate a particular context (the ocean and sea-side activities), a particular service (diving courses and excursions) and specify certain design applications required by the 'client' that need to be considered when a creative solution is sought. This statement is applied occasionally to examples in this section to illustrate how the techniques may be used by graphic design students to facilitate creative thinking: The following idea generation techniques are described in this section:

- Random Association
- Morphological Synthesis
- Metaphors and Analogies
- Mind-mapping
- Idea Checklist
- Visual Thinking
- Sense Connections

TECHNIQUE 1: RANDOM ASSOCIATION

The technique of 'Random Association' was popularized by Edward de Bono as a lateral thinking strategy and is one of the simplest and most effective techniques for idea generation in the repertoire of divergent thinking techniques (de Bono, 1993:117). The technique embraces a process where different words, images or objects are randomly chosen and juxtaposed with a keyword of the problem statement with the aim to open up new ideas around the chosen focus (Michalko, 1998a:24). The technique aims to sensitize the mind to new possibilities that it would otherwise not have considered. The method is also named 'Forced Relationships', referring to the process where a relationship or an association is forced between two unrelated elements (Marra, 1990:207). Marra (1990:18), in his book on idea generation in the advertising industry, regards the technique as an effective springboard for students' creativity stating that 'playing with forced relationships demands an openness to idea possibilities while grinding against the gears of preconceived realities'.

Various authors have proposed different approaches and methodologies to the Random Association technique, including the following:

- The use of a *pre-selected list of words* to choose from is a method that is favored by Clegg and Birch (1999:116). They devised two lists of words which could be used to implement the technique. The lists are available in Annexure J and could be used by graphic design students to employ the technique. The first list provides a general compilation of words such as fire, city, peace, missing, hole, teeth, glue, etc. The second list offers an interesting approach to the technique. It provides a list of *adjectives* such as black, squeaky, shiny, salty, loud, sharp, icy, etc. Forcing a relationship between adjectives such as these and a concept could potentially result in surprising perspectives on a commonplace idea.
- De Bono (1993:179) favors the use of a *dictionary* to select random words for creative stimulation. He suggests selecting a word in a dictionary at specific intervals of seconds on a watch or thinking of a page number and a position of the word on that page (e.g. page 82, the fourth word from the bottom). Alternatively, one could close one's eyes and stab one's finger randomly at a page of a newspaper, dictionary or book (one should take the word nearest to one's finger).
- Another approach suggests that keywords of the problem statement could be typed into the search box of a search engine of the *World Wide Web* (Clegg and Birch, 1999:32). As the words appear on the screen, associations could be made with them and new options and possibilities that arise from these words or their associations could be jotted down.

- Clegg and Birch (1999:25) also suggest an approach which utilizes a *short story* to open up creative possibilities. After a problem statement has been formulated, one could read an unrelated story and allow the subconscious to make links between the creative problem to be solved and the activities or characters in the story. They warn that one should not attempt to force any links but should simply use the technique as a springboard for ideas or to eliminate preconceived assumptions about the problem statement.
- Cave (1999) recommends the use of *random picture cards* that could be made from various pieces of advertising material or magazines. Cards could typically include pictures of furniture, kitchen items, art works, people, buildings, scenes or abstract designs. The cards could be shuffled and a card chosen at random. He notes that pictures should preferably not contain text to allow a more right brain approach.
- Cave (1999) also suggests that numerous words could be written on pieces of paper and place into a bag, to be pulled out randomly. This approach may be used in a graphic design classroom to ignite creative approaches to a problem and demonstrate the effectiveness of the technique. A bag (or a colorful hat) filled with word-cards could be passed around amongst students. They could pull words out at random, read it aloud and the class could collectively brainstorm various creative possibilities triggered by the random words.

Fundamentally, the Random Association technique entails that one selects any type of random input and relate that input (or its associations) to a problem statement or keyword in the statement to trigger new lines of thought that could be used as solutions to a creative problem (Clegg and Birch, 1999:32). Usually, ideas are generated that one would not normally think of if one approaches the problem from a logical or conventional way (de Bono, 1993:180).

In the instance of the 'standard problem statement' (referred to earlier), it seems essential that the creative solutions for the problem should contain visual imagery and design elements which are somehow related to the core business and location of the company, namely diving activities at sea. Applying the Random Association technique to this problem statement the list of words in Annexure J could be used to trigger new lines of thought. For example, juxtaposing the concept of 'sea' to the notion of 'rainbow' (a word on the list) could trigger the idea of an abstract element resembling a multi-colored ocean symbolic of the diverse and colorful marine life that divers could explore. If the list of *adjectives* in Annexure J is used, connecting the notion of 'sea' with the color 'black' could trigger a black and white design approach similar to a woodblock carving which resembles the rippling quality of water.

Marra (1990:18) pointed out that numerous successful advertising ideas resulted from dissimilar realities that were connected to form a new reality. He states: 'Often creative ideas are the new and relevant realities resulting from unique and unexpected connections between very commonplace realities'. Likewise, Mednick (in Dacey and Lennon, 1998:155) believes that creativity is the process by which ideas that are already in the mind are associated in unusual, original and useful combinations. Max Ernst (in Cave, 1999) also describes creativity as 'the marvelous capacity to grasp mutually distinct realities and draw a spark from their juxtaposition' – which is in essence the function of the Random Association technique. Marra (1990:18) suggests that when students use the technique, they must begin from the premise that 'nothing is and everything can be'. He notes that the technique has a unique way of sparking one's creativity and could therefore assist individuals to overcome blocks and barriers (Marra, 1990:208). De Bono (1993:181) agrees that the Random Association technique is particularly useful when an individual feels stagnated, 'blank' and do not know where to start. It also helps one to overcome predisposed ways of viewing reality and as a result, it helps one to stay fluent and original with one's ideas (Marra, 1990:20).

Michalko (1998a:11), in his book entitled *Cracking creativity* analyzed the thinking processes of creative geniuses with the aim to formulate thinking strategies that could induce creativity. He pointed out that the technique of 'Forced connections', as he calls it, is a style of thought that is typical of creative geniuses, saying that 'it is the ability to connect the unconnected by forcing relationships that enable them to see things what others do not see'. He refers to Leonardo da Vinci for example, who forced a relationship between the sound of a bell and a stone hitting water. This enabled da Vinci to make the connection that sound travels in waves. Cave (1999) also noted that several geniuses of the past arrived at solutions to problems through chance events, referring to Newton who discovered gravity when he was hit on the head with an apple while sitting under an apple tree. He argues that the technique of 'random input' is a deliberate way to create chance events which could allow individuals to enter the existing patterns of their thinking at a different point.

The fact that the technique of Random Association triggers a process where established thinking patterns could be 'entered from a different point' is the basis of de Bono's (1993:12-15) explanation for the effectiveness of the technique. The technique echoes de Bono's definition of lateral thinking which is described as 'seeking to solve problems by unorthodox or apparently *illogical* methods' (in Starko, 1995:210). According to de Bono (1993:178), the method seems 'illogical', but when the brain's self-organizing mechanisms is understood, it becomes clear why the technique is so effective. As it was explained in Chapter 2, de Bono (1993:4) postulates that the human brain functions as a self-organizing system which sorts all incoming information alongside certain patterns of perception. He explains that creative or

novel ideas originate 'outside' the normal habitual patterns of perception in a 'new' track of thought. When the brain is deliberately forced to 'escape' from the established track of thought through the use of the Random Association technique, it purposefully stimulates a new track of thought which could result in a novel or a new perspective of a problem (de Bono, 1993:179). Many of the techniques of word play (especially Random Association) are designed to force the mind to 'jump across' its usual pathways (mental ruts) or make new connections between old pathways in order to create a new idea out of two seemingly disparate ideas (Brown, 2004:701). De Bono (1995:18) points out that in an active (patterning) system such as the human brain, the random word provides a new entry point and as one works back from the new entry point, chances increase of using patterns one would never have used if one had worked outwards from the subject area.

De Bono (1993:177) pointed out that the human brain is 'so good at making connections that even if the random word (or any other input) seems very remote; the brain will make the needed connections back to the focus area'. When exposed to new patterns the brain does not immediately recognize, it will attempt to conform information to known patterns to increase the likelihood of recognition or understanding (Eiffert, 1999:20). Therefore, even if creative ideas may originate from an illogical starting point, de Bono (1993:15) explains that due to the pattern forming processes of the brain novel ideas are always *logical in hindsight*. Creative solutions are only understood when it is accommodated in a 'main' track of thought which renders it logical and relevant. The brain has a remarkable ability to create order out of chaos, even when no order really exists (Clegg and Birch, 1999:54). It is this ability which is utilized to stimulate new ideas through the use Random Association technique.

TECHNIQUE 2: MORPHOLOGICAL SYNTHESIS

The technique of Morphological Synthesis (also known as Morphological Analysis) was developed by Fritz Zwicky (1996) and utilizes the fact that a creative problem is actually made up of a series of elements and sub-elements. The first step in the technique entails a process where a problem or a central theme of a problem is divided into categories, dimensions or main attributes. The next step involves that a matrix existing of rows and columns is drawn, the categories are written at the top of the columns and each category is then *further broken down* into attributes, associations or features (Stein, 1974a:211). The various items listed in the matrix are then 'mixed and matched' across the matrix to suggest unconventional combinations of concepts. The technique is related to the Random Association technique in the sense that it also utilizes forced connections (Clegg and Birch, 1999:87). However, the Random Association technique connects *unrelated* concepts to the problem statement and the Morphological Synthesis technique connects variables which are

all somehow *related* to the central concept of the problem to be solved. The solutions that are triggered by this technique are therefore often very useful and relevant to the problem statement.

Using the 'standard problem statement', the technique's potential to trigger innovative creative solutions in the context of graphic design is illustrated in the following example (Table 3). The matrix in this example explores three significant concepts (ocean, marine life and diving) as main categories for the generation of ideas. Each concept is then broken down into sub-elements representing attributes or associations thereof. The matrix in Table 3 indicates how various connections could be made amongst the various sub-elements which could be used as a springboard for creative solutions:

Table 3: Example of a matrix used for idea generation

OCEAN	MARINE LIFE	SCUBA DIVING
transparent	corals	breathing
Wind	fishes	equalizing
sparkling	Colorful	flippers
Reflections	Shells	movement
Waves	Seahorse	weights
sea spray	Submarine	wetsuit
Splash	Jelly fish	bubble

The connections in this matrix could for example suggest the following few starting points for design solutions to the standard problem statement:

- **Fishes + flippers:** Connecting 'fishes' with 'flippers' could portray divers as fishes or fishes with diving equipment in a humoristic approach to design or advertising applications. This idea could suggest that divers who train at the advertised company is as skilled as fishes in the water.
- **Colorful + splash:** Combining the word 'colorful' with 'splash' could suggest an abstract design which utilizes a multi-colored splash to refer to the concepts of water and colorful marine life.
- **Breathing + submarine:** Connecting the notion of 'breathing' with 'submarine' could trigger a light-hearted image of a 'breathing submarine' and could suggest an image of a fish-submarine hybrid. This could be adapted to explore an advertising angle which utilizes the concept of training diving skills in a breathing fish-like submarine with windows to view marine life.
- **Transparent + wetsuit:** the combination of the two concepts 'transparent' and 'wetsuit' may trigger a formal solution which superimposes transparent shapes such as the shape of a wetsuit or a coral over other non-transparent imagery.

- **Waves + shells:** this combination could suggest a design or typography which utilizes shells in a wave-like pattern.

Although this example highlights only a few potential creative ideas, numerous other ideas could be derived from this matrix. Connections could be made randomly or selected according to their potential for creative exploration. In many instances, the unique combinations may not be used directly but they could stimulate creative thinking and trigger other more useable ideas. The technique could potentially produce an abundant quantity of original, often surprising idea combinations in a very short time (Davis, 1971:262). As with the Random Association technique, this technique could help students to overcome blocks since it assists the creative thinker to make connections that are not usually thought of by means of logical and conventional problem solving processes (Marra, 1990:208).

The Morphological Synthesis technique could also be used as a form of group-brainstorming in a classroom situation. The class could be divided into three groups, each group representing one main category. The sub-elements associated with each category could be generated by the members of each group. The matrix could then be drawn with all the sub-elements included and the class could then freely brainstorm various creative solutions. It may also be helpful to adhere to Osborn's (1992:11) guideline to defer judgment while generating the sub-elements. Being critical of concepts as they arise may inhibit responses which could turn out to have creative potential. The technique of Morphological Analysis is often adapted to modify existing products or invent new concepts for product design (Stein, 1974a:214). In these instances, the product is divided into its main descriptive attributes (e.g., material, color, shape) and alternatives for each attribute are then listed in the matrix. Stating that 'inventions are often new ways of combining old bits and pieces', Cave (1999) cites the following example (Table 4) of how the technique could be used to modify a common ball-point pen to invent a new type of pen:

Table 4: Example of a matrix used to generate ideas for product design

Cylindrical	Material	Cap	Ink source
Faceted	Metal	Attached Cap	No Cartridge
Square	Glass	No Cap	Permanent
Beaded	Wood	Retracts	Paper Cartridge
Sculptured	Paper	Cleaning Cap	Ink cartridge

Invention: A cube pen; once corner writes, leaving six faces for ads, calendars or photos.

Although the unconventional 'invention' which resulted from this example may seem a bit impractical, Cave's example nevertheless demonstrates the methodology of the technique and its potential to trigger new perspectives for product design. This 'modification' version of

the Morphological Analysis technique may be used in graphic design to alter existing concepts of packaging for instance. To change an existing packaging for chocolates for example, students might identify the attributes of the existing packaging concept in terms of size, shape, color and material, list a number of alternatives for each in a matrix and connect them to form new unexpected combinations.

TECHNIQUE 3: METAPHORS AND ANALOGIES

The use of metaphors and analogies is one of the most common creative problem-solving techniques in existence (Marra, 1999:111). In analogical thinking, similarities between two different universes of meaning are explored and ideas from one context are transferred to another in search of parallels, insights, fresh perspectives or new syntheses (Starko, 1995:221). As indicated by the other divergent thinking techniques, several theories of creativity emphasize the importance of bringing together remote ideas in order to stimulate a new point of view. Sanders and Sanders (1984:19) notes that metaphorical thinking combines logic rational (left brain) thinking with imaginative (right brain) thinking. They state that it is 'perhaps the fastest and most effective route to link the left brain with the right brain'. According to them, metaphors make the sequential, verbal and factual knowledge of the left brain more accessible to the holistically orientated right brain by suggesting a pattern or an image of the 'big picture'. As such, they argues, metaphors provide a bridge between the two separate thought processes of the brain, a bridge which allows imagery to be verbalized and creates imagery for facts. As Sanders and Sanders (1984:19) phrase it: 'this bridge connects the literal and the figurative, the factual and the imaginative, the proven and the intuitive'.

Metaphor is the basis of the well-known creativity technique known as *Synectics* which was developed by Gordon (1992:164) and Prince (1992:168). The word is coined from two Greek words meaning 'the joining together of different and apparently irrelevant elements' (Dacey and Lennon, 1998:182). Specifically, *Synectics* promote the use of three types of analogy: (1) *personal analogy*, in which the individual imagines himself to be the object with which he is working; (2) *direct analogy*, in which facts, knowledge or technology from one domain are used in another; (3) *symbolic analogy*, which explores fantastic imaginary solutions to the problem (Amabile, 1983:191). *Synectics* places a high priority to the generation of emotional and non-rational responses during creative problem solving (Gordon, 1971:15). Gordon believes that creativity becomes probable when insight is gained in 'underlying, 'non-rational, free-associative concepts, which flow under the articulated surface phenomena'. However, as Stein (1974b:180) notes, 'regardless of the emphasis placed on non-rational factors, the *Synectics* process has very *practical goals* namely the conscious and deliberate generation of creative solutions to a given problem (author's italics).

The use of metaphors has been applied successfully in various fields such as scriptwriting, business and advertising to solve creative problems. It is a conceptual tool which could also be used strategically by students to trigger innovative approaches to advertising and design problems (Sanders and Sanders, 1984:7). The following example illustrates how the technique may be used to stimulate original perspectives to the standard problem statement which was used in the other examples. For the purpose of this example, analogies for the activity of scuba diving, which is a key concept of the problem statement, are explored.

SCUBA DIVING IS LIKE:

- Being in **outer space**: being weightless as in water - no gravity; movements slow like swimming; wearing breathing gear; exploring new worlds...
- Being on **safari**: wearing a rucksack and binoculars like wearing a mask and oxygen bottles; viewing animals and wildlife (like marine life)...
- Watching a **movie**: element of surprise, special effects like spectacular marine life, colorful; relaxing...
- Being like a **frog**: diving in water with flippers like frog feet; soft slippery wetsuit with stripes like a frog....

Examples of creative solutions which could be triggered by the various analogies are:

- The analogy which compares scuba diving to being in outer space, perhaps walking on the moon, could trigger an advertising slogan such as '*You don't need to leave planet Earth to explore the unknown...*' If the advertising campaign includes visual and sound mediums such as television, surprising scenes of fishes swimming in outer space could be used or parallels could be drawn between the quiet, bubbly sound typical of the underwater experience and the quietness of outer space.
- The analogy which compares scuba diving to a safari excursion could trigger a humoristic advertising angle which features a character in safari clothes, bush gear and binoculars attempting to view marine life from a boat, leaning forward with his binoculars in the sea (or even walking under the sea in safari clothes, using an absurd or surrealistic approach). An accompanying slogan such as '*Dive with us...the professional way*' could effectively emphasize the contrast between 'amateur' approaches such as those used by the character on 'safari' and professional diving methods.
- Comparing scuba diving to the pleasurable activity of watching a movie could evoke advertising angles which draw parallels between the spectacular, relaxing and entertaining aspects of watching a movie and scuba diving. A slogan such as '*For the real experience- dive with us*' could contrast the thrill of the real experience with the fictive experience of watching a movie. Using television and video as medium,

fascinating imagery could be generated if a movie scene become 'real' with fishes and sea creatures escaping from the two-dimensional movie screen into the real world of a movie theatre.

- Comparing a diver with a frog could lead to the use of imagery which uses a silhouette of a diving frog which transforms into the shape of a human diver.

These examples illustrate how metaphorical thinking could trigger unconventional and new approaches to the generation of an advertising concept. To explore the full creative potential of each analogy, Sanders and Sanders (1984:38) suggests that each analogy should be described in detail, including active aspects (such as how or why it works, what it does, what effects it has, how and when it is used) as well as passive aspects (size, material, color, position, etc.).

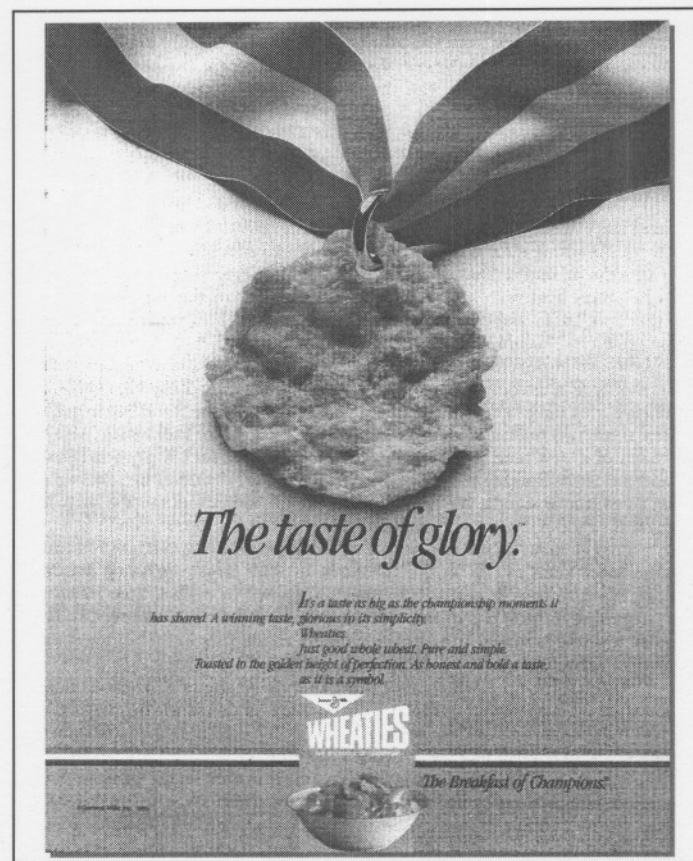
Marra (1990:127) pointed out that one of the reasons why the use of metaphors is so effective in the advertising industry is because metaphors tend to involve the audience by allowing them to make the connection between the two unrelated concepts. When viewers understand the connection successfully, they become active participants in the concept. Marra argues that this should be the goal of all creative advertising ideas. Referring to analogical thinking as a 'simple formula $A + B = C$ ', Marra (1990:111) believes that when one concept (A) is metaphorically associated with another concept (B) to generate an advertising idea, the combination of these two concepts becomes a *new reality* (C). He distinguishes between a number of metaphor types that could be used in the advertising industry, such as *feature* metaphors, *benefit* metaphors and *reverse* metaphors (Marra, 1990:112-120).

'Feature metaphors' utilizes physical and tangible characteristics of an advertiser as a departure point for analogical thinking (Marra, 1990:112). Features could include the shape, content, size, texture or any characteristic inherent to a specific product, store or service. Marra recommends that columns are used to execute the technique. The features of the product which needs to be advertised are listed in one column ('A') and each features' similarities with something else is explored in the other column ('B'). An example of the successful use of a feature metaphor, using the feature of 'shape', is illustrated in the advertisement for the cereal, *Wheaties* (Figure 6) (Marra, 1990:114). In this advertisement the shape of the cereal flake (A) is likened to the shape of a medal (B) to create the new image (C) (Marra, 1990:119). The connection clearly and uniquely conveys the meaning of the *Wheaties* theme line, 'The breakfast of champions' (see Figure 6).

The cereal flake being presented as a medal and linked to the slogan has, aside from being original and surprising, some 'logic' to it. It illustrates de Bono's (1993:15) view that although creative ideas occur outside 'main track' thinking, they will always be logical and relevant in

hindsight. Marra (1990:119) warns that when using this technique, no features should be seen as too insignificant to explore analogically. He notes that there is nothing particularly special about the shape of a *Wheaties* flake in terms of an appeal to the target audience, but once the association is made however, all the positive connections from medal to flake and from flake to medal take place in the audience's mind. Although the shape of the flake may have seemed insignificant to explore for creative solutions, it became significant through the analogy.

Figure 6: Advertisement for the cereal, *Wheaties*



Another type of association that could be used in advertising is *benefit* (or *key selling point*) metaphors (Marra, 1990:120). It refers to the features which will cause the target market to benefit from the product or service, such as durability, health or pleasure. This approach attempts to find metaphors for the beneficial aspects of the product or service which need to be advertised. According to Marra (1990:127), benefit metaphors as well as *behavioristic* metaphors - which examine audience behavior when using a product or service - focus more on the audience than on the product. For example, in the statement, 'A is like B', A could refer to a situation *before, during or after* the product is purchased. Another type of metaphor described by Marra is *reverse* metaphors. This type of metaphors use statements which take on a twist, such as 'A is *not* like B'. This technique could also be followed with behavioristic associations, for example, 'diving (A) is *not* like B'. An example of an advertisement which

utilizes a reversed metaphor is illustrated in Figure 8 to explain another technique entitled 'Reverse Sense Connections'.

Starko (1995:221) believes that metaphorical thinking could be trained and practiced as a skill in the same way as many other cognitive skills. Indeed, she proposes that training in metaphorical thinking should be an integral part of creativity training. She suggests that students should first start with simple comparisons between similar objects, later progressing to more abstract processes that explore metaphors for concepts such as 'happiness', 'freedom' or 'space'. Starko also suggests that students could practice metaphorical thinking by forcing similarities between remote objects. For example, they might examine how a rock is like a tree or how a feather is like a book. Once students understand the potential of metaphors to spur original perspectives on creative problems, these methods may help them to overcome creative blocks and remain creatively productive (Marra, 1990:127).

TECHNIQUE 4: MIND-MAPPING

Mind-mapping was formalized as a technique in the early 1970's by Tony Buzan, a British brain researcher, as a 'whole-brain' alternative to linear thinking (Michalko, 1998a:55). The procedure optimizes the brain's potential to expand one or more concepts into a multitude of other concepts that could trigger creative solutions. In essence, mind-mapping is a systemized method to exploit the vast potential of the brain for idea generation (Michalko, 1998a:58). The idea is essentially to extend a concept as far as possible using a map-like structure which facilitates the easy flow of ideas (Michalko, 1998a:65). The first step of the technique entails that a key concept or a main theme is written in the center of a piece of paper. A number of significant components or dimensions of the key concept is then written around the central word and connected with lines or 'branches'. Each of these words is then extended by connecting them to one or more related ideas which are then once again used as starting points for the generation of more related ideas (Michalko, 1998a:64). As an idea generating tool, the technique makes it possible to generate - in a relatively short time - a large number of concepts which are either directly or indirectly related to the core theme of a problem statement (Starko, 1995:206). Furthermore, the organic, circular arrangement of information aids the thinker in making connections or seeing relationships amongst the words which could open up visual and conceptual possibilities that one would not usually think of (Michalko, 1998a:64).

For many years it was accepted that the human brain works in a *linear* or *list-like* manner, a falsehood based on the linear nature of speech and print (Cave, 1999). In speech, people are restricted by the nature of time and space to communicate one word at a time. Mind-

maps on the other hand are based on the *logic of association*, not the logic of time (as in a list) (Wycoff, 1991:41). Cave (1999) notes that the mind is perfectly capable of processing information which is non-linear (as in a mind-map) and in many instances the limitations of linear presentations of information could be a disadvantage. He explains that the human brain is very different from a computer - whereas a computer works in a linear fashion, the brain works associatively as well as linearly, continuously comparing, integrating and synthesizing information. He notes that although a single stream of words is being processed during, for instance, a conversation, reading a book or thinking, a continuing and enormously complex process of *sorting* and *selecting* is taking place in one's mind. Every single word and idea has numerous links attaching it to other ideas and concepts. It is this ability to make numerous and quick associations which is utilized in the process of mind-mapping.

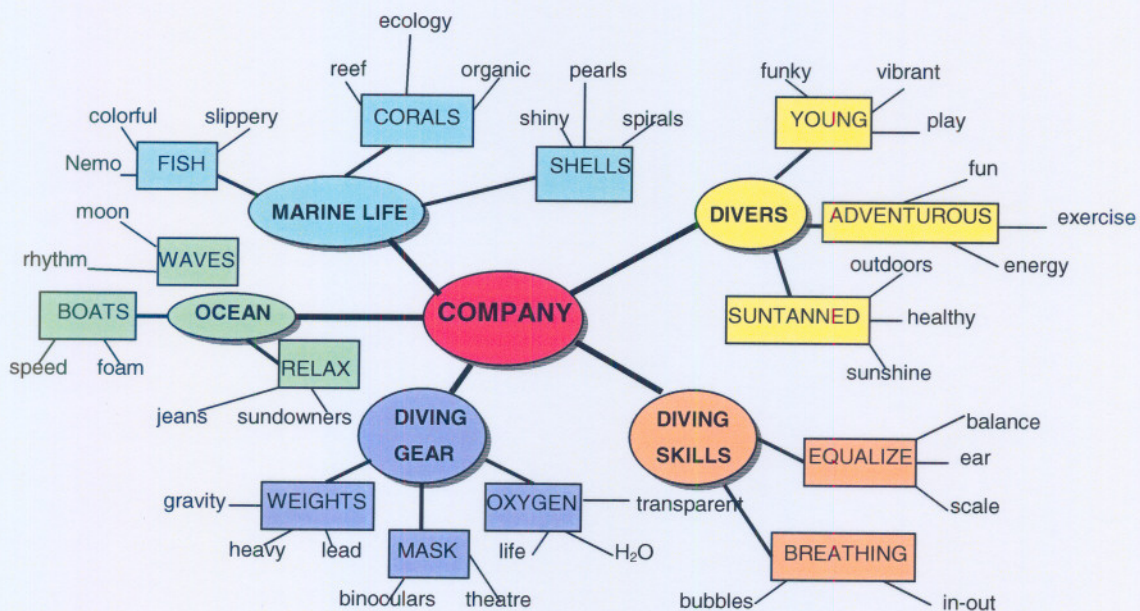
Since the structure of a mind-map is expansive, organic and flexible, an individual's mind allows information to flow more freely than in linear forms of information processing (Wycoff, 1991:40). Wycoff who studied mind-mapping as a technique to stimulate creativity, points out that the organic structure of a mind-map makes it easy to add new information to existing clusters of information or to initiate and connect a new line of thinking. She says that once the brain realizes it can associate anything with anything else, it will almost instantaneously find associations, especially when given the trigger of a stimulus. In so doing it gives an individual the freedom 'to roam the infinite expanses of his or her brain' (Wycoff, 1991:57). Cave (1999) regards a mind-map as the ideal structure to indicate relationships amongst words since the brain works primarily in an interlinked and integrated manner similar to a mind-map. In fact, as Wycoff (1991:40) phrases it, 'mind-maps can be viewed as an external photograph of the complex inter-relationships of an individual's thoughts at a given time'. According to her 'a mind-map enables one's brain to "see itself" more clearly' (Wycoff, 1991:39).

As a means of information gathering, mind-maps have several advantages over other forms of information processing (Wycoff, 1991:43; Buzan, 2004). These are:

- mind-maps could include the use of symbols, colors, geometrical shapes, signs, arrows and even quick drawings to extend the meaning of words, mark similar concepts or highlight ideas with potential;
- it provides an overview of the whole picture and the details at the same time;
- a mind-map rapidly produces a great of number of ideas and at the same time organizes them by placing each idea next to what it is related to;
- it indicates the order of ideas: it is easy to determine the flow and direction of ideas;
- a mind-map gathers and holds large amounts of data, summarized as keywords;
- recall and review of information is more effective and more rapid with mind-maps.

When these advantages are considered, mind-mapping seems to be an ideal technique to gather and organize information during the idea generation process in graphic design. If graphic design students understand these advantages, this thinking tool could aid them to overcome creative blocks and provide a structure for the natural flow of ideas. The following mind-map (Figure 7) illustrates how a concept could be expanded to trigger numerous perspectives and ideas which could be explored for visual solutions in graphic design. Once again, the standard graphic design problem statement was used to illustrate the potential of the technique. The mind-map in this example places the 'company' for which the creative solutions is required in the center and explores the following key dimensions related to the company: 'marine life'; 'divers'; 'ocean'; 'diving gear'; 'diving skills'. The mind-map makes use of geometric shapes, a variety of line thickness and changing font sizes to indicate the 'growth' order of the concepts.

Figure 7: An example of a mind-map which is used to stimulate ideas for a typical graphic design problem.



This mind-map illustrates how ideas which flow associatively from words expand a core concept into multiple related concepts which could be explored for creative solutions. For example, the keyword 'diving gear' triggered the concept of 'oxygen' which could suggest a name for the company whose core business is diving activities. The name 'OXYGEN DIVING' connects the company with notions of life giving, energy and exercise. The mind-map also illustrates how concepts could be connected to strengthen their creative potential. For example, concepts which were generated in the mind-map such as 'rhythm' and 'waves' could be related to concepts such as 'breathing' and 'in-out' to explore visual solutions related to the name 'Oxygen'. The technique of mind-mapping may yield even more ideas if it

is used collaboratively as a brainstorming exercise in a classroom situation (Cave, 1999). If each student or a group of students produce a number of keywords and a number of related concepts for the same problem statement, the class could collectively generate a vast number of concepts in a relative short time. Such a 'collective mind-map' could be drawn on a white board to trigger creative solutions to the problem at hand. It is also an effective method to demonstrate the potential and mechanism of the mind-mapping technique.

Various types of mind-maps could be used to produce different sets of information. For instance, a 'sensory mind-map' utilizes the five senses (taste, sight, touch, sound, smell) as keywords to generate ideas (Cave, 1999). Another approach aims to define the problem as accurate and specific as possible by breaking it down into the 'six universal questions' starting with 'who, what, where, when, why, how' as keywords. This approach ensures that one thinks productively by looking at things in as many different ways as possible (Michalko, 2003a:52). A method that may be particularly effective for graphic design is the notion of 'visual mind-mapping' (discussed in more detail later in this chapter). This approach makes use of 'visual thinking' and ideas are recorded by means of quick mini-drawings or symbols. The internet also provides a number of websites which assist individuals in the technique of mind-mapping such as 'Axon Idea Processor', 'Mind Manager' (hosted by Tony Buzan) and 'Concept Draw Mind-map'. Indeed, the availability of mind-map assisting software on the internet bears evidence of the technique's popularity as an idea generator and an information processor.

TECHNIQUE 5: THE IDEA CHECKLIST

The notion of using a checklist with 'trigger questions' to facilitate creative idea generation was first initiated by Alex Osborn as a strategic method to induce creativity (Arnold, 1992:18). The technique embraces a process where an individual uses a list of key questions as catalysts to transform existing ideas or to spark new ideas. Osborn's original checklist technique was based on nine basic categories which he believed could facilitate creative thinking (Stein, 1974a:216). These nine principles were later arranged by Eberle (1992:327-329) into the well-known mnemonic, 'SCAMPER', where each letter signifies a particular trigger word based on a creative principle: 'S' for substitute, 'C' for combine, 'A' for adapt, 'M' for magnify or minify, 'P' for 'put to other uses', 'E' for eliminate and 'R' for reverse. The main aim of the checklist is to provide a range of pre-determined 'prompts' which would ensure that an individual explore *all possible modifications* of an existing concept or arrive at *new* solutions by means of the transformation process. Each trigger is viewed as a possible source of innovation in respect to a given problem (Davis, 1971:262). In his discussion of the technique, Michalko (2000:19) remarked: 'As you apply the SCAMPER checklist of questions, you'll find that ideas start popping up almost involuntarily.'

Although the trigger questions facilitate divergent thinking, strictly speaking, the technique is based on the notion that everything new is some addition or modification of something that already exists (Michalko, 1998a:95). This notion also underlies a significant aspect of Synectic theory. As explained earlier, one of the main aspects of the creativity program Synectics is the use of analogies to trigger innovative ideas. Analogical thinking is based on the principle of connection: as Fuller (in Cave, 1999) remarked: 'Synectic thinking is the process of discovering the links that unite seemingly disconnected elements. It is a way of mentally taking things apart and putting them together to furnish new insight for all types of problems.' Based on this premise, the Synectic program developed a checklist of 'trigger mechanisms' to initiate mental processes which facilitate creative transformation of ideas or elements of ideas (Cave, 1999). This extensive list is presented in Annexure K. Effectively, these trigger mechanisms involve the 'coordination of concepts into new structures', which is believed by Gordon (1992:166) to be the essence of creativity.

Although the keywords in the SCAMPER checklist may be applied to various fields it seems particularly appropriate for application to graphic design. The Synectic checklist shows certain similarities with the SCAMPER triggers, such as 'substitute' and 'combine', yet, it is far more extensive and complex than the latter. It embraces triggers such as 'hybridize', 'metamorphose', 'emphasize' and 'mythologize' which may be too intricate for direct application to graphic design (Cave, 1999). However, other triggers in the Synectic checklist may indeed be functional for application in graphic design, such as 'fragmentize', 'distort' and 'repeat'. An 'ideal' checklist for graphic design purposes could be devised if the keywords in the SCAMPER checklist are combined with *certain* appropriate triggers in the Synectic list. The checklist presented hereunder offers such integration and is intended for use in the particular context of graphic design education. Each trigger question is furnished with explanations of probable use in graphic design. Several authors (Stein, 1974a:216; Michalko, 1998a:95; Starko, 1995:202) have described, interpreted and applied each trigger in the SCAMPER and Synectic checklist in various ways.

The following checklist synthesized their perspectives and focus on those interpretations which are relevant for graphic design education. Since the checklist is quite extensive, it may be useful to present students with a summarized version of it or display it as a poster in the classroom. A summary of the triggers in the Idea Checklist technique that may be useful as a hand-out for graphic design students are provided as Annexure L.

Proposed creativity checklist for graphic design application:

➡ SUBSTITUTE

Fundamental to the substitution trigger is the notion that individuals might discover new perspectives on existing ideas or invent new ideas if they are prompted to freely substitute elements of a concept or a design (Stein, 1974a:216). In graphic design, a number of formal elements of a design could be substituted with alternatives such as colors, shapes, images, lines, material. Concepts such as locality, people and environments could also be substituted (Michalko, 1998a:95). Cave (1999) suggests that the 'six universal questions' (who, what, where, when, why, and what) is used as prompts for substitution. This could result in for example, persons, reasons, time, objects and places, to be substituted with alternatives to explore fresh perspectives on seemingly fixed concepts.

➡ COMBINE

The process of combining or synthesizing is regarded by many experts to be the essence of creativity (Michalko, 1998a:95). Combining parts, elements, ideas, concepts or purposes could often initiate a new conceptual approach to a graphic design problem. This may entail combining separate elements of a logo or combining an editorial lay-out approach with a poster lay-out. Essentially, the combine trigger aims to prompt an individual to connect, link, unify, mix and merge elements, concepts or approaches to discover new ideas (Stein, 1974a:217). Often the best results are obtained when dissimilar concepts or previously unrelated subjects are combined (Michalko, 1998a:95). Starko (1995:202) suggests that a concept could be taken apart and *recombined* into a new order – an approach which could be effective when applied to visual imagery of graphic design applications such as logo's, web-sites, posters or even illustrations.

➡ ADAPT

The adapt-trigger prompts an individual to seek for creative solutions through a process of adaptation and consideration of other styles and visual or conceptual solutions to problems similar to the one that needs to be solved. Commenting on this trigger, Michalko (1998a:97) notes that one of the paradoxes of creativity is that, in order to think originally, individuals must familiarize themselves with the ideas of others, existing styles and other successful solutions to similar problems. Indeed, in graphic design education, students are often presented with visual examples of successful approaches to design problems as a method to stimulate their creativity. Naturally, the process of adaptation does not imply plagiarism but rather seek to sensitize individuals to potential approaches which could be adopted for solving design problems. Essentially, this trigger operates in the same way as the 'Idea Arbitrage' technique described by Brown (2004:705). With Idea Arbitrage, individuals see an existing solution in one context and ask themselves where else it might work. An example of

this technique's application from the field of consumer products design is the electric toothbrush with rotating bristles that grew out of a much more trivial discovery - the rotating lollipop.

➡ **MINIFY OR MAGNIFY**

Initially representing the 'M' in the SCAMPER checklist, this trigger entails minimizing or a magnifying elements to explore creative alternatives (Starko, 1995:202). 'Magnifying' initiate alterations such as making an element bigger, stronger, longer, thicker, higher, more extensive, more exaggerated or more frequent. It could also initiate changes in proportion, relative size, ratios and dimensions (Cave, 1999). Intriguing effects could often be achieved when this trigger is used to overstate aspects or to take them to a dramatic extreme. When using the trigger to 'minify', elements, objects or visual imagery, it could be made smaller, shorter, lighter, less frequent, more compact, more condensed or understated (Stein, 1974a:216). In the context of graphic design, this trigger seems more applicable to technical and formal aspects of design work than to conceptual dimensions of a problem.

➡ **PUT TO OTHER USES**

When Osborn (in Arnold, 1992:18) initiated his checklist technique he argued that creative ideas could be generated if one attempts to deliberately think of other uses for a particular object or concept. The trigger may even be combined with the Random Association technique to juxtapose a design element or object randomly with words to initiate unconventional uses for it such as placing an advertising slogan or a logo where it is not usually placed. Finding another use for a design application may also be done by changing the context in which it is used. Placing design concepts, elements or images deliberately in other contexts could potentially initiate original approaches to creative problems or initiate other uses for them.

➡ **ELIMINATE**

This trigger facilitates a process where certain elements of an idea are purposefully eliminated or reduced to arrive at the essence of a concept. It prompts individuals to examine whether all parts and elements of a design or concept are necessary (Starko, 1995:204). In graphic design the process may involve trimming down, subtracting or omitting colors, shapes, lines, images or forms from a design. The process of elimination could also help to narrow concepts or advertising messages down to its essence or lead to the simplification, abstraction, abbreviation or stylization of design elements and concepts (Cave, 1999).

➡ REVERSE

Commenting on this aspect of the SCAMPER checklist, Michalko (1998a:99) remarked that creativity often entails 'rearranging or reversing what we know in order to find out what we do not know'. The 'reverse' trigger facilitates divergent thinking by prompting individuals to reverse existing concepts, patterns or elements to discover radically new approaches or perspectives (Starko, 1995:202). Stein (1974a:217) suggests that this trigger may be used to transpose positive and negative, consider opposites or experiment with turning elements upside down or backwards. Indeed, in graphic design, changing negative spaces into positive forms or to consider opposites in technical as well as conceptual aspects of a design could potentially yield very different effects.

➡ ANIMATE

This trigger (and the following few triggers) forms part of the Synectic checklist and draws on the dynamic potential of animation to spur creative solutions. The trigger might be used to mobilize static elements, either as a pictorial element or as a real animation to liven up an idea or a design concept. Cave (1999) suggests that the trigger may be used to consider which human (or movable) qualities a subject has. The principles of animation, which involves repetition and progression, are certainly approaches which could be explored in the formal language of design.

➡ SUPERIMPOSE

To a certain extent the 'superimpose'-trigger is related to the 'combine' trigger in the sense that elements are merged and connected. However, this trigger deliberately prompts an individual to play with overlapping or covering elements and images. Surprising effects may be achieved when dissimilar images are superimposed and interesting visual effects might result from images or elements which are obscured by overlapping. This trigger could be especially useful when a design is executed on computer with software which allows multiple and transparent overlapping with relative ease.

➡ FRAGMENTATE

Cave (1999) describes this aspect of the Synectic checklist with the following words: 'separate, divide, split, dissect, take your subject or idea apart, chop it up or disassemble it'. Particularly useful for formal design elements and visual images such as logos, illustrations or even typography, it suggests that new creative solutions might be initiated when one experiments with fragmentation. This could include visual devices such as grids or patterns to accommodate smaller elements.

➡ ISOLATE

This trigger prompts individuals to separate (isolate) certain elements of a concept or a design to either place greater focus on it or suggest a new conceptual meaning to it (Cave, 1999). In graphic design isolation of visual objects and shapes could be done by means of compositional layout or by means of line and color divisions. One could also experiment with isolation through the use of a viewfinder (a small square window cut out of paper) to crop certain aspects of a design. New compositional or conceptual solutions may be triggered by the cropped images.

➡ DISTORT

Distortion is a relative easy technique for transforming ideas and visual images radically. Through the use of appropriate computer software, elements could be distorted in seconds to suggest new meanings or innovative creative solutions. Elements could be twisted, melted, crushed, buried, cracked, cut or made longer, wider, fatter and narrower by using the spectrum of software tools available for distortion today (Cave, 1999). The trigger has significant potential for transforming the meaning and appearance of existing design concepts into original and unconventional ideas.

➡ REPEAT

Finally, experimenting with the repetition of design elements such as colors, shapes or textures could often ensure unity or fresh visual approaches to a problem. Once again, this technique is made very simple with computer software which allows individuals to multiply any image or element in a very short time. This trigger unfortunately has the pitfall that individuals could repeat elements indiscriminately to achieve creative effects. However, if students are made aware of this potential pitfall, the technique could be used sensitively to initiate solutions such as the use of sequence, progression or the subtle echoing of shapes and colors. An example of how this technique could be utilized in graphic design to explore multiple creative options for an existing concept is provided in Annexure M at the end of this chapter. The example indicates how the triggers could facilitate the conceptualization of various creative solutions for an existing concept.

In his discussion of the checklist technique, Davis (1971:265) notes that the use of this technique to trigger creativity might seem to make students dependent on the checklists, thus preventing them from 'thinking for themselves'. However, acknowledging the merits of more intuitive methods of creative problem solving, he emphasizes that checklists should be viewed as a valuable *supplement* to intuitive methods. As 'supplement', it might serve to facilitate divergent thinking at times when individuals experience creative blocks (Starko, 1995:205). More importantly, Davis (1971:266) argues that 'innate creative abilities might be

strengthened through exercise', implying that the continuous use of the trigger mechanisms might sensitize students to the various creative possibilities suggested by the triggers, thereby improving their creative ability.

TECHNIQUE 6: VISUAL THINKING

Referring to it as 'idea-toons', the technique of Visual Thinking is described by Michalko (1991:186) in his book *Thinkertoys*. He describes the notion of 'thinking in pictures' as a parallel and complimentary language to verbal language of words. The technique implies that an individual *substitute words* with quick drawings or symbols to express the thinking process involved in creative problem solving. Most of the divergent thinking techniques that were discussed up to now make use of words as the primary means of creative exploration. Yet, the power of Visual Thinking as a technique to evoke visual solutions is particularly relevant for the purposes of graphic design which depends greatly on visual images for creative solutions. Cave (1999) notes that the modern world places an emphasis on words as the primary vehicle of information, yet pictures are 'worth a thousand words'. He points out that the reason why visual images is more effective as words is because they make use of an extensive range of cortical skills, such as color, form, line, dimension, texture, visual rhythm and especially imagination - a word taken from the Latin *imaginari*, literally meaning 'to picture mentally'. He concludes: 'images are therefore often more evocative than words, more precise and potent in triggering a wide range of associations, thereby enhancing creative thinking and memory'.

Stressing the value of visual imagery as a method of creative documentation, Michalko (1998a:51) points out that the explosion of creativity in the Renaissance was intimately tied to the recording and conveying of knowledge in the language of drawings, graphs and diagrams (e.g. da Vinci's and Galileo's work). He notes that several of these geniuses utilized visual thinking as a means to capture information, to formulate problems and to solve problems. Michalko regards visual thinking as a method to 'liberate' thinking from the limitations of language. He argues that visual images often enable individuals to communicate information in more accurate or abstract ways than words, for example referring to Darwin's tree diagrams that effectively conveyed his ideas on evolutionary change and allowed him to pull seemingly unrelated information together (Michalko, 1998a:54).

The formal technique of Visual Thinking requires that a range of words which relates to the problem are generated according to a systemized method (such as mind-mapping or attribute listing) and then deliberately substituted with images to produce a great number of cryptic visual images as substitution for the words (Michalko, 1991:187). Since a large

number of visual imagery is generated during the process it could effectively facilitate visual solutions to graphic design problems. The 'short-hand' nature of the process tends to produce abstract 'summarized' representations of words, typical of the type of visual imagery which is often used for logos. Furthermore, the technique of Visual Thinking forges a right brain approach to the process of creative problem solving (Clegg and Birch, 1999:72). Since the right brain handles holistic, artistic, imagery-based thinking as opposed to logical, sequential and numerical thinking of the left brain, this technique naturally induces a less rational, more creative approach to problem solving.

Michalko (1991:187) recommends that the technique of Visual Thinking starts with a process similar to the Morphological Synthesis technique which was described earlier. It entails that a problem statement should be divided into certain keywords or categories which are then each described by means of a list of attributes. Each of these attributes is then 'described' by drawing an abstract graphic symbol for it. Michalko (1991:188) suggests that these images could be drawn on separate index cards and then grouped, regrouped and juxtaposed randomly into various relationships to provoke ideas. They could also be drawn on a transparent surface and superimposed on each other to trigger surprising pictorial solutions. Instead of using cards, when a matrix is generated using the Morphological Synthesis technique, a 'visual matrix' which substitutes the words with small scale sketches could be generated. These images could then be combined freely in quick sketches in the same way that the Morphological Synthesis combines words to forge original ideas (Michalko, 1991:189).

Alternatively, the words in a mind-map could be substituted with small sketches to create a 'visual mind-map'. An example of how the technique has been applied to the mind-map in Figure 7 is provided in Annexure N at the end of this chapter. An advantage of applying visual thinking to a structure that contains previously generated words such as a mind-map or a matrix is that it encourages an individual to draw concepts which may be difficult or abstract and would not be considered for drawing during the draft process. For example, when words such as 'energy' and 'rhythm' that were generated in the mind-map in Figure 7 are substituted with drawings it may lead to innovative solutions to a creative problem (see Annexure N).

Apart for being effective to generate visual solutions for graphic design problems, the technique could also strengthen students' ability to visualize – an ability which is of vital importance in graphic design. Indeed, Starko (1995:215) argues that training in visualization should form an integral part of creativity training. According to her this may be done by means of the slow reading of a text by a teacher while students practice with closed eyes to

visualize the images in the text. Visual thinking could also be practiced through a classroom exercise which involves 'visual brainstorming'. This technique requires a facilitator to read words at random (or words related to the problem) while students draw quick sketches representing the words.

TECHNIQUE 7: SENSE CONNECTIONS

Davis and Scott (1971:206) note that research on characteristics of creative people has indicated that they tend to have a greater sensory awareness of the world around them. He believes, however, that most people, using the technique of 'Sense Connections', could be *purposefully trained* to increase their sensitivity and openness to sensory experiences. The technique focuses on the five senses of sight, sound, taste, touch and smell as starting points for the generation of ideas. When the technique is applied to a given problem statement each of the five senses evokes a different set of responses (Cave, 1999). This variety of sense-based responses provides a fertile information base which could be utilized for creative problem solving (Starko, 1995:236). As Marra (1990:99) phrases it, 'the technique allows one to see the world more fully and completely'.

Marra (1990:138) proposes a systematic approach to the technique which is particularly useful when applied to the advertising of a product or service (see Table 5). Similarly to the technique of analogical thinking which was discussed earlier, Marra's approach entails that one analyses a product, an object or a service in terms of its *features*, the *benefits* which it holds for the user or the *behavioristic* considerations associated with it. These aspects are then systematically connected or associated with the five senses as in Table 5.

Table 5: Example of a systematic approach to the metaphor technique (Marra, 1990:138)

SENSE CONNECTIONS	sounds like	smells like	tastes like	looks like	feels like
Feature 1, 2, 3	A	A	A	A	A
Benefit 1, 2, 3	B	B	B	BB
Behavior 1, 2, 3	C	CCCC

Behavioristic considerations could be extended to open up even more creative possibilities by dividing behaviors into *how, when, where and why* the product or service is used, connecting each aspect to the five senses (Marra, 1990:158). Although the technique seems to be particularly useful to spur ideas for advertising concepts, the use of sense connections is not restricted to advertising. Various other ways could be improvised to explore the

creative possibilities offered by the technique. For instance, it could be used for illustration purposes to sensitize an artist to various sensory dimensions of a subject which need to be illustrated.

Marra (1990:142) suggests another unconventional approach to the technique, entitled 'Reverse Sense Connections'. This method involves that the five senses are used to play with the opposite effects associated with each sense. It reverses the statements in the previous framework to 'does *not* smell, taste, sound, look or feel like'. This approach has been used in the advertisement for a *Hunter* fan in Figure 8 (Marra, 1990:143). In the advertisement the noise of an old airplane propeller is vividly contrasted with the idea of a quiet fan. The sound image is the reverse of what the product offers. The benefit of quietness is conveyed through its opposite, that of noise. To generate the contrast, the creative mind behind the idea had to form a connection between what the product's sound was *not* like, in this case the sound of an old airplane propeller.

Figure 8: An example of 'Reversed Sense Connections' in an advertisement



Imagine sleeping with one of these in your bedroom.

When you buy a ceiling fan these days you never know what you're getting. Even at lowest speeds, some can sound a bit raucy. At high speeds they can shake and rattle like an old biplane.

So how can you be sure of getting a quiet, smooth running fan? Buy a *Hunter Original*. Hunter's cast-iron construction and precision balanced hardwood blades prevent wobbling. And the motor comes with a written limited lifetime warranty.

But more important, our unique 'oil bath' lubrication keeps it running silently as a whisper year after year after year.

Granted, you may pay a little more for a Hunter. But you'll sleep a lot better, too.

Hunter.
The Quiet Fan.

Hunter... Building The Best For Over 100 Years.
© 1995, Hunter Fan Co., 2500 Fyffes Ave., Memphis, Tenn. 38114, (901) 243-2100

The technique of Sense Connections could also be extended to incorporate the previous technique of Visual Thinking and produce quick sketches which symbolize each of the imaginative sensory experiences. These sketches may be used as starting points for visual solutions with symbolic potential. As mentioned earlier in the discussion of the Mind-map

technique, a variety of sensory associations could also be explored through the use of a 'five senses mind-map' (Cave, 1999). In this technique the five senses are arranged around a central concept and several words related to the five senses are generated as triggers for visual or conceptual solutions. The advantage of a mind-map approach to the technique is that the various sensory experiences could be expanded to trigger multiple concepts related to each sensory experience.

To conclude: the techniques discussed in this section clearly entail a methodical and systematic approach to creative thinking. They indicate that creativity may be significantly improved if a certain thinking strategy is employed. Most of these techniques are based on de Bono's (1993:12-15) theory which explains how creative thinking originates in the human brain (as discussed in Chapter 2). This theory holds that incoming information in the brain is automatically and habitually organized into recognizable thinking patterns. Creative thinking becomes probable when these habitual perceptual patterns are deliberately overturned through the use of mental devices such as the techniques discussed in this section (de Bono, 1993:4). As Michalko (1991:109) phrases it: 'the techniques choreograph information in such a manner that one moves in determined steps toward a new idea'. Michalko (1998b:23-25) analyzed the thinking strategies of creative geniuses of the past (such as Edison, Einstein, da Vinci) to determine how did they arrive at their creative solutions. Many of the techniques described above suggest thinking strategies which are essentially the same as the strategies used by the creative geniuses that Michalko referred to. They are:

- **geniuses look at problems in many different ways** (such as the 'Six Universal Questions' technique that investigates a problem using 'who, what, where, when, why, how' as keywords);
- **geniuses make their thoughts visible** (such as the Visual Thinking technique);
- **geniuses make novel combinations** (such as the Morphological Associations technique);
- **geniuses force relationships** (such as the forcing of connections in the Random Association technique);
- **geniuses think in opposites** (such as the Sensory Connections technique);
- **geniuses think metaphorically** (such as the Metaphors and Analogies technique).

The techniques are intended to be used as deliberate strategies to induce creativity in graphic design students. They seem, amongst all the divergent thinking techniques discussed in the literature on creativity, to be the most appropriate for application in graphic design. Although the techniques may be effective to employ when creative energy are low in students, the methods could also be used by highly creative individuals to maximize their creative ability (de Bono, 1993:7). However, in order to obtain the most creative results from

these techniques, it is important to adhere to a few guidelines for their execution. These guidelines are discussed in the next section.

7.3 Guidelines for using the proposed divergent thinking techniques

De Bono (2004) warns that individuals, when they are initially introduced to the techniques, may at first experience resistance to work with them. He notes that most people, especially those who regard themselves to be creative, tend to believe that it is 'easier' to generate ideas spontaneously. Manion and Haukkala (1994:17) also notes that it is important to overcome the initial awkwardness one tends to experience when first introduced to creativity techniques, since rewards will become evident as he/she learns to use them successfully. For many, the systematic and structured approach of the techniques seems to contradict the notion that creativity is generally associated with free and intuitive working methods (de Bono, 1993:xii). It may also seem to slow individuals down. However, de Bono (2004) argues that if individuals become skilled in the use of the techniques and experience their effectiveness, they will soon realize the merits of these structured methods. He uses the analogy of learning to ride a bicycle to explain the learning process involved in mastering the techniques: at first, learning to ride a bicycle feels awkward, but once individuals become skilled in riding a bicycle they realize that the method is much faster and more effective than walking. Likewise, once individuals feel proficient in using the techniques, they will realize that is often more effective and less time consuming than unstructured, intuitive methods.

However, several authors have emphasized that for the techniques to be effective, individuals must be prepared to 'master' the techniques through practice, training and instruction (Petty, 1997:76; de Bono, 1993:190). Therefore, in order for students to become proficient and confident in the use of the techniques it is essential that individuals understand the techniques properly and gain firsthand experience of their potential to generate ideas. The techniques should ideally be used regularly until they could be used effortlessly and with confidence (de Bono, 1993:7). Petty (1997:76) suggests that students should not view the techniques as 'crutches or recipes' for creativity but that it should be regarded as devices to release their own imagination. Essentially, the techniques should be regarded as 'toys' (Marra, 1990:137). Preferably they should be used quickly and playfully. Indeed, playfulness has been identified as a distinguishing trademark of creative people (Cautilli, 2004:143).

Adopting a playful attitude seems to be an important mindset to employ while using the techniques. Indeed, several theorists have proposed that a playful approach can have beneficial effects on creativity (Amabile, 1983:180; Eiffert, 1999:81; Dacey and Lennon, 1998:120-121) by facilitating conditions in which blood flow to the brain's cerebral cortex is maximized to ensure the effective execution of higher order cognitive abilities such as creativity (Groviè, 1992:78). According to Russ (2003:291) play fosters the development of

cognitive and affective processes that are important in the creative act. She notes that substantial bodies of studies have found a relation between play and divergent thinking. Petty (1997:69) observed that playfulness facilitates enjoyment of the creative process and therefore encourages maximum exploration of creative ideas. A relaxed playful attitude may also help to employ the principle of deferring judgment as well as the production of large quantities of ideas (Marra, 1990:107). Furthermore, playing with the techniques imply that they could be freely combined and adapted according to need - if one technique does not produce results one should not dwell on it but simply move on to another (Marra, 1990:137). Robert Root-Bernstein (quoted in Weiss, 2001:61) says, 'play returns us to the pre-symbolic drives of gut feelings, emotions, intuition and fun from which creative insights stem, thereby making us inventors...play provides a fun and risk-free means of seeing from a fresh perspective, learning without constraint, exploring without fear'.

Although de Bono (2004) agrees with the emphasis on a playful attitude when employing the techniques, he emphasizes the *precise* use of the techniques. He argues that the thinking tools work most efficiently when used correctly according to their proposed methodologies. Precise use implies being skilful in the application of the techniques as well as knowing the steps and creative potential of each technique. It is also important to persevere in the *full execution* of each technique. De Bono (1993:284) recommends that the techniques should be used in the same way a carpenter uses his tools: one should know what tool should be used for which purpose and how to handle each tool to obtain the best results.

7.4 Conclusion

The divergent thinking techniques discussed in this chapter provide graphic design students with a repertoire of thinking strategies which could be used on their own or facilitated in a classroom situation to maintain high levels of creativity. As explained earlier, when these techniques are implemented in the educational context of graphic design, it is imperative that students should be encouraged and supported to obtain proficiency in the use of the techniques. This may be done through the use of conventional educational media such as structured study guides and lectures which provide explanations, demonstrations and examples of how to employ the techniques. The facilitation of certain classroom exercises may also be useful to illustrate the methodologies of the techniques. Ideally, students should understand and trust the potential of these techniques to generate creative ideas and accordingly employ them habitually and effortlessly.

The divergent thinking techniques have several advantages for the educational context of graphic design. They could help students to overcome creative blocks and combat anxiety associated with feelings of inability. In fact, the techniques could help to ensure the

development of the full range of social-psychological prerequisites for creativity which was discussed in Part 1, namely the cultivation of intrinsic motivation, autonomy and self-belief in students as well as the minimization of stress in students. When students feel confident and proficient in the use of the techniques, it may help to build intrinsic motivation; equally, if creative results are achieved through the use of the techniques it could help to foster self-belief in students. Additionally, since the techniques could be used as self-help strategies it may contribute to the development of autonomy in students. Finally, in view of the fact that the techniques have a certain 'reliability' built into them (de Bono, 2004) it could be an important strategy to reduce stress and feelings of inability in students. Essentially these techniques provide a support system for graphic design students to ensure creative productivity at all times in the educational milieu.

Apart from these advantages the divergent thinking techniques may also strengthen students' innate creative abilities since they provide exercise in certain thinking processes that underlie creativity (Davis, 1971:266). Indeed, Starko (1995:190) suggests that creative ability is 'learned' by means of the techniques since they mimic or stimulate the cognitive processes that underlie creativity. According to her, using the techniques develops attitudes or habits of mind which facilitate creativity such as independence in judgment, willingness to explore multiple options and persistence beyond the first idea. The implementation of the divergent thinking techniques in graphic design education may therefore not only yield short-term results such as the generation of creative ideas, but may also ensure the long-term cultivation of creative thinking skills as well as the maintenance of the social-psychological prerequisites for creativity. Furthermore, if these strategies are combined with the deliberate management of the creative process in various stages - as proposed in the next chapter - it could contribute significantly to sustain creativity in graphic design students.

CHAPTER 8

THE CREATIVE PROCESS

Introduction

This chapter examines the phases in the creative process with particular focus on the model proposed by Geoffrey Petty. Other models such as the *Osborn-Parnes model for creative problem-solving* is introduced and briefly discussed. The chapter explains how the effective management of the various phases of the creative process in graphic design education could help to enhance student's creativity. Each of the six phases in Petty's model is discussed in terms of its purpose, mind-set, cognitive activities and advantages for the creative process. A summary of the process that may be used to facilitate the teaching and execution of the phases in graphic design education is provided. The chapter is concluded with reference to the notion of whole-brain thinking that results from the purposeful implementation of the cognitive strategies proposed in the chapter.

8.1 Background

Although a certain mystery will always shroud the very being of the actual cognitive processes taking place in the human mind during the process when creative activity originates, several authors with expertise in the field of creativity have attempted to analyze and define the various phases of creative processes. Authors such as Parnes (1992b), Petty (1997), Treffinger *et al.* (2000) and Amabile (1996) have indicated that when an individual proceeds from the first stirring of interest to the successful manifestation of a creative product, one usually passes through various phases, each with a particular intent, focus and mind-set. In many instances, the main motivation for analyzing the various steps in creative processes has been the notion that one's creative ability and skills may be deliberately increased should the cognitive nature of each phase be understood and consciously 'managed' during creative processes. This point of view implies that if creative processes are effectively managed, creativity may be purposefully enhanced. Petty (1997:101), for instance, is of the opinion that: 'Creative blocks are only rarely due to lack of talent or bad luck. Usually they are due to poor management of the creative process'. From the perspective of graphic design education this view suggests that students' ability to be creative may be improved should they be taught how to manage different creative processes with efficiency.

Various models of creative problem-solving processes have evolved over the past decades, with the 'classic' *Osborn-Parnes model for creative problem-solving* (known as the CPS

model) probably the most well known and widely used among them. As such, most models representing creative processes are directed at *general* creative problem solving and not at a particular discipline such as graphic design. Still, many models may, on different levels, have some potential to be applied to the specific context of graphic design. However, the model which seems to be the most suitable for the purposes of a proposed Methodology for fostering creativity in graphic design education is presented by Geoffrey Petty (1997), a London-based educationalist who specializes in the development of higher-order thinking skills. His exposition of the various phases in creative processes synthesizes various perspectives of earlier models. An explanation of the various phases of Petty's model as well as the reasons for the inclusion of Petty's model into the proposed Methodology is addressed in a later part of this chapter. In the following paragraphs other models that preceded and may have influenced Petty's model are described.

One of the first and frequently cited attempts to describe cognitive processes involved in creativity was made by the early twentieth-century reformer Graham Wallas in his book, *The Art of Thought* (1949). Summarizing his own and other people's work in this area, Wallas's five phases of creative activity entail the following (in De Beer, 1993:45-48):

- **Interest:** 'Interest' is regarded as a necessary precursor to creative ability: the more interest one has in a particular problem, the more creative the solution is likely to be.
- **Preparation:** This step refers to the process of collecting all relevant information. The phase of preparation is not supposed to generate original solutions yet, but the more extensive a student cultivates and applies divergent thinking processes during this phase, the more possibilities are open for producing a creative solution.
- **Incubation:** During this phase the problem is left unattended, allowing the subconscious to 'work' on a problem and reveal useful information or a potential solution to a problem.
- **Illumination:** This phase is synonymous with ideation and refers to the deliberate generation of ideas and possible solutions to a problem. The phase of Illumination is characterized by inspiration, revelation and insight. This phase is linked to and associated with the 'Eureka!' or 'Aha!' experience which usually occurs during the process of idea generation.
- **Verification.** This phase is aimed at the identification of the strengths and weaknesses of a prospective creative resolution to a problem in order to verify whether it is an appropriate solution.

Although Wallas's model of creativity has been discredited as being too simplistic (Dacey and Lennon, 1998:196) the four steps that he describes are still recognized in several other models of creativity which have been developed later, such as the CPS model and Amabile's

Componential model of creativity (Amabile, 1996:94; Figure 3, Chapter 2). However, significant as his model was as a precursor to other models, his model serves primarily as a description of creative processes rather than as a pragmatic strategy to facilitate creative thinking.

The *Osborn-Parnes model for creative problem-solving* (Annexure O) on the other hand, is aimed at practical usability and is widely used as a practical tool to aid creative problem solving in various fields such as business, management and advertising (Parnes, 1992a:133). The CPS model draws as closely as possible to what people really do when they are solving problems (Treffinger *et al.*, 2000:13). Some versions of the CPS model such as the one described by Isaksen and Parnes (1992:438) incorporate a divergent phase (which focus on the generation of ideas) and a convergent phase (which focuses on the evaluation and selection of ideas) in each phase of the creative process. Structured training courses in creative thinking have been presented for years at the *Creative education foundation* at the State University of New York in Buffalo, U.S.A., as well at their annual conference, the *Creative problem-solving institute* (Parnes, 1992b:2). Over fifty years of academic research has supported the effectiveness of the CPS model as a method to train and enhance creative thinking (Rose and Lin, 1992:131).

The CPS model assists an individual or a group through six phases of creative thinking (Isaksen and Parnes, 1992:438). These phases are identified and typified as Mess-finding, Fact-finding, Problem-finding, Idea-finding, Solution-finding and Acceptance-finding. The main purpose of the Mess-finding phase is to roughly estimate and analyze a problem situation and to direct interest towards a broad and general goal or solution. In the Fact-finding phase, participants sift all available information and clarify possible steps or a direction to a solution. The Problem-finding phase implies that a specific problem statement is formulated. Idea-finding represents a process of finding many ideas for solutions to the problem or parts of the problem. Solution-finding implies an evaluation or judgmental process of arranging the different ideas produced during the previous phase and selecting those most likely to produce effective solutions. Finally, in the Acceptance-finding phase, a plan is devised for implementing appropriate solutions. Each step guides students through a thinking process to ensure that he/she eventually produces one or more creative, workable solutions to the problem at hand.

The CPS model has been a very dynamic model: it has grown and changed continually since its conception in an attempt to render the process more user-friendly. The Cougar (1995:119) variant of the CPS process (Annexure P), for example, connects each phase with a series of divergent thinking techniques (similar to those discussed in Chapter 7) that could be used to facilitate the particular aims of each phase. Although the CPS process continues to be used

and taught at various centers in the U.S.A., the model proposed by Geoffrey Petty (1997) seems to be particularly useful for application in the context of graphic design education. His model forms the basis of the creative process to be included into the proposed Methodology for enhancing creativity in graphic design students. A motivation for the selection of Petty's model into the proposed Methodology is provided in the next section.

8.2 Motivation for the inclusion of Petty's model into the proposed Methodology

The inclusion of Petty's model into the proposed Methodology for fostering creativity in graphic design education has been motivated to a large extent by the fact that his exposition of the various phases in the creative process seems to focus on the solving of problems related to *creative tasks* such as the typical problems encountered in the context of graphic design. Most other models, such as the CPS model, are directed at *general problem solving* and are popularly used for idea generation in fields such as business, management and marketing. Petty's (1997:19-20) description of the creative process, however, addresses several aspects related to artistic problem solving, such as personal motivation, the creative environment and the practical execution of a creative task.

Another reason for the inclusion of Petty's creative process in the proposed Methodology is his emphasis on various mind-sets for each phase which corresponds noticeably with the various mind-states identified in Part 1 of this thesis as essential prerequisites for creative ability - such as intrinsic motivation, self-belief, autonomy and playfulness. As reflected in Petty's section 'Further Reading', he seemingly draws on the work of Arnabile (1983) which emphasizes the importance of aspects such as intrinsic motivation for creative ability as well as on de Bono's (1992) principles of lateral thinking. The work of these authors contributed significantly to the formulation of the proposed Methodology.

Most other models of creative processes focus mainly on the *cognitive* dimension of a creative process. Petty's model on the other hand, integrates cognitive aspects of creativity with social-psychological aspects that are needed for creative ability. He acknowledges the fact (as explained in Chapter 2) that the purposeful teaching of creative ability requires a holistic approach which recognizes *both* cognitive and various social-psychological dimensions of creativity. In his article, entitled *Fostering creativity in the classroom*, Cropley (1997:85) listed a number of well-known programs for fostering creativity (Annexure E, Chapter 2). As indicated by this list, most programs give the greatest weight to the *cognitive* aspects of creativity (idea generation, combining elements of information, etc.). Cropley (1997:88) regards the basic weakness of the techniques and programs on the list as that 'they are too narrow in their psychological content', noting that the creative process does not depend on a few specific skills that can be learned like tables in arithmetic. He emphasized

that creativity arises not only from cognitive dimensions, but from a constellation of psychological characteristics including expertise, creativity-related skills and abilities, motivation and personal properties such as self-confidence (Cropley, 1997:89). This premise has been the basis for the inclusion of a spectrum of cognitive, social, emotional and personal dimensions into the proposed Methodology. Since Petty's model combine social-psychological dimensions of creativity with cognitive strategies his model seems particularly related to the proposed Methodology. This correlation has been an important consideration for its inclusion into the Methodology.

8.3 Managing the creative process according to Petty's model

This section introduces Petty's approach to the deliberate management of the creative process as a strategic method to enhance creative ability in graphic design students. The discussion incorporates references to the work of other authors that may be relevant to a particular phase under discussion, but the main framework is derived from Petty's exposition of the creative process. The phases in Petty's model are summarized as follows:

- **Clarification** which focuses on the aims and objectives of the creative problem to be solved;
- **Inspiration** - an idea-generating phase;
- **Distillation** which entails the selection and distillation of promising ideas;
- **Perspiration** – a phase which aims at maximizing the creative potential of ideas;
- **Evaluation** which considers strengths and weaknesses in work;
- **Incubation** which allows the sub-conscious to 'work' on problems.

Petty (1997:20) does not view the six phases of the creative process as a linear sequence of events which follows one another chronologically – as in the instance of models such as the CPS model. He acknowledges the fact that the various phases in the creative process are in fact interwoven and may be encountered many times during the creative process – sometimes for very short periods only and not necessarily in any particular sequence. This approach seems to be applicable to the context of graphic design where creative tasks demand a certain amount of flexibility between the various phases of creativity. For example, the process of 'distillation' where the best idea or element is selected amongst others may be employed in earlier and later phases of the creative process.

The following sections provide a detailed discussion of the activities and mind-sets of each phase. A summary of the six phases of the creative process is provided in section 8.4.

PHASE 1: CLARIFICATION

The process of clarification – which entails the determination of the central or ultimate purpose of a creative project – is generally regarded as a vital aspect of creative problem solving. Only occasionally a creative act requires a dutiful working out of a pre-formulated idea. A creative act is often an ongoing search for meaning or purpose in the work (Petty, 1997:79). The clarification process usually commences with the formulation of a problem or a problem statement which summarizes the key elements of a creative problem. This process is sometimes referred to as ‘problem framing’ (Treffinger, *et al.*, 2000:36) or ‘problem finding’ (Starko, 1995:104). When an individual asks the right question at the outset it helps to generate solutions that are both *novel* and *appropriate* (Starko, 1995:104). Students should be taught to use logic to support originality. This process implies the utilization of opposite mind-sets during the creative process: determining what the ‘question’ is entails logical, rational thinking, while creating the ‘answer’ requires ‘out-of-the-box’ and divergent thinking processes (Starko, 1995:75).

The Clarification phase ensures that creative activity is focused towards the right direction. The activity involved in the Clarification phase helps one to decide among alternative ideas. This phase may also ‘unblock’ an individual when stuck (Petty, 1997:118). In the discipline of graphic design the primary purpose of a creative project is usually addressed in a brief provided by a client to a designer. Although the main purpose of an assignment may often seem clear in such a brief, further interrogation and negotiation is usually needed to discover the real needs of a client (Petty, 1997:80). The Clarification phase therefore implies more than formulating the most important aim of a design project; it also entails a process of gathering the most important information which is needed to solve a creative problem (Treffinger, *et al.*, 2000:31). Information gathered during the Clarification phase of a creative assignment is vitally important: it could become the starting point of idea generation and act as a guide or a map for keeping one’s creativity on course (Marra, 1990:91).

Treffinger *et al.* (2000:31) refers to the Clarification phase in his transformed version of the *Osborn-Parnes model for creative problem-solving* as the Exploring Data phase. According to Treffinger *et al.* (2003:31) the goal aimed at during this phase is to avoid missing or ignoring important data which may be essential in finding the solution to a problem. He emphasizes that it is important to look beyond the mere facts and obvious information that are apparent at the outset to expose more obscure information which may help to solve a creative problem. Various thinking strategies have been recommended to ensure that all necessary information is accumulated during the Clarification phase. Petty (1997:85), for example, suggests a technique using the question ‘why?’ continually to clarify the ultimate

purpose of an assignment. To illustrate how this technique may be used in graphic design to clarify the main purpose of an assignment, the 'standard' problem statement (formulated in Chapter 7 to demonstrate divergent thinking techniques) is used:

Example:

Problem statement:

Conceptualize an idea for an advertising campaign. This concept should include a name, a logo and a slogan for a sea-side company which offers scuba diving courses, facilitates diving excursions and sells diving equipment.

- *Why does the sea-side company need a name, logo and a slogan? > To build and establish the visual identity of the company.*
- *Why is it important to establish a visual identity for the company? > To create a particular image for the company which represents the core business of the company.*
- *Why is it important to create a particular image for the company which represents the core business of the company? > To attract clients who need the services provided by the company.*
- *Why is it important to attract clients who need the services provided by the company? Because these clients are the 'niche' clients who may build long-term relationships with the company.*
- *Why is it important to attract 'niche' clients who may build long-term relationships with the company? > To ensure sustainability of the client base.*

This example illustrates how aspects such as attracting 'niche' clients and ensuring the sustainability of the client base may be considered as some of the primary aims of creating a corporate identity for the company. These facts may guide a designer to scrutinize the particular profile of the target market more carefully before designing a logo. When using this technique it seems important to avoid too simplistic, obvious answers such as 'to make money'. The overall aim is to probe deeper into the problem which needs to be solved. Concomitant with this aim it is also attempted to discover information which could help to find a creative solution which serves the ultimate purpose of the assignment. It should be aimed at to generate as many different reasons as possible for solving the problem. One should even 'allow reasons to overlap, be messy and open-minded and leave time for pondering and incubation' (Petty, 1997:85). Answers could be streamlined and formulated more accurately at a later phase.

Several other clarification techniques have been proposed by authors with expertise in the field of creativity. The Couger (1995:119) variant of the Creative Problem Solving Model

(Annexure P), for example, lists a number of creative thinking techniques which could be used for each phase in the creative process. For the Clarification phase (or Compiling Relevant Information phase, as he phrases it), Couger recommends the use of techniques such as Attribute Association, Mind-mapping and the Six Universal Questions technique. As starting points for information gathering the Six Universal Questions technique utilizes the questions 'who?, where?, why?, what?, when? and how?' to clarify all the potential dimensions of the problem which may play a role in the creative solution. The mentioned technique is also recommended by Treffinger *et al.* (2000:31) to gather relevant information about a creative problem. Although Treffinger's exposition of the technique (Annexure R) is aimed at generic problem solving, it may be used as a general guideline in graphic design to gather relevant information during the Clarification phase. To illustrate this, the following example, using once again the 'standard' problem statement indicates how the technique may be applied to clarify or gather data about a typical graphic design problem.

Example:

Problem statement:

Conceptualize an idea for an advertising campaign. This concept should include a name, a logo and a slogan for a sea-side company which offers scuba diving courses, facilitates diving excursions and sells diving equipment.

WHO? **Q's:** 1. *Who* are the people forming the target market? *Who* buys diving equipment, dives and needs diving lessons? 2. *Who* provides the services?

A's: 1. *Young people, adventurous people, male and female; experienced and inexperienced divers.* 2. *Companies and individuals involved in the diving industry; qualified instructors, sales persons.*

WHERE? **Q's:** 1. *Where* do the various activities (diving, selling, instructing) take place? / 2. *Where* does the slogan, name or logo need to be displayed? 3. *Where* is the shop which sells diving equipment?

A's: 1. *At the seaside, under water, on a boat, in a shop selling diving equipment; in a lecturing room; in a pool (for diving exercises).* 2. *On the shop front, boats, wet suits, stationery, promotional items, study guides, diving certificates.* 3. *At Sodwana Beach Resort – a shop within walking distance from the beach, next to a fast food kiosk and a curio shop.*

WHAT? **Q's:** 1. *What* activities are involved? 2. *What* is sold? 3. *What* is taught /learned? 4. *What* experiences are involved?

A's: 1. *Diving, swimming, snorkeling, boat riding, viewing marine life, buying, learning.* 2. *Swim suits, weights, oxygen bottles, wet suits, masks.* 3. *Diving*

skills, equalizing techniques, breathing skills, diving ethics, dangers and health hazards. 4. Relaxation, exercising, fun.

WHEN? **Q's:** 1. *When do people scuba dive?* 2. *When do they take diving lessons?* 3. *When does the company sell equipment?*

A's: 1. *During holidays, week-ends.* 2. *After hours, Saturday mornings.* 3. *From 09:00 to 17:00, weekdays.*

WHY? **Q's:** 1. *Why do people scuba dive?* 2. *Why are a logo, slogan and name needed?* 3. *Why do people buy new diving equipment?* 4. *Why does the company sell diving equipment?*

A's: 1. *People scuba dive to have fun; to relax; because marine life fascinates them; for the social aspects of diving; because they love outdoor activities.* 2. *To make people aware of the company, to attract the attention of the target market, to resemble and advertise the core business of the company.* 3. *Because they want to follow the latest trends in diving fashion.* 4. *To provide a service to clients.*

HOW? **Q's:** 1. *How do people scuba dive?* 2. *How do people learn to scuba dive?* 3. *How does the shop's exterior and interior look like?*

A's: 1. *They use oxygen bottles, mouthpieces and a snorkels to breathe under water, they use weights to move downwards in the water, they use flippers to swim, they wear wet suits and masks.* 2. *They receive lectures and demonstrations, they practice in swimming pools, they write tests and do practical examinations.* 3. *Modern with large tinted glass windows, funky stain and steel furniture, colorful, painted pillars to support the roof.*

Although various other questions and answers may be generated, this example demonstrates how the mentioned technique probes into the problem statement to expose and clarify a wide range of perspectives on a given situation which may contribute to the generation of a creative solution. Some of the information may seem irrelevant but it at least ensures that all possible dimensions of a problem are clarified. The process facilitates the unfolding of information which may play a vital role in the conceptualization of a creative solution. Such a solution may otherwise have slipped the attention of the designer if the process of clarification has not been followed. Reflecting on the modern, funky style of the exterior and interior of the shop, for example, may be an important concern in discerning the 'look and feel' of the design intended to use as corporate identity for the sea-side company. This aspect may have slipped the attention of a designer if the 'how' series of questions had not been asked.

Another advantage of a clarification process which unfolds relevant information about a problem is that it may help to facilitate idea-generation – which usually is the next step in the creative process. As illustrated in the previous example, the process of probing and questioning could generate an extensive number of words and concepts (such as ‘masks’, ‘fun’ and ‘breathing’) which may be used to trigger creative ideas. Many of the idea-generating techniques discussed in the previous chapter rely on word-generation methods to generate starting points for creative ideas, as in the Six Universal Questions technique. This technique could also be used to develop a mind-map with the Six Universal Questions as starting points to obtain clusters of information.

Although the process of clarification is generally associated with initial phases of the creative process, Petty (1997:81) notes that it may be equally useful to employ clarification questions during any phase of the process to determine whether the work is still ‘on track’. He regards it as important while working on the project to clarify on a continual basis whether the work is still in line with the main aim of the assignment (Petty, 1997:81). In these instances it is important to use questions such as the following (Petty, 1997:77):

- What exactly do I want to achieve?
- What is my key purpose?
- What do I want to communicate?
- What outcomes are expected of the finished project?
- What exactly is the problem I am trying to solve?
- What is my key idea?
- Did I thoroughly investigate the areas I need to understand?
- Did I get all the information I need?

Petty (1997:78) notes that these questions ‘direct one’s creative energy with great efficiency, allowing one to achieve more in less time’. Measuring one’s progress continually against the ultimate purpose of an assignment ensures that the problem solver stays focused and clear about the requirements of the project. The clarification process could also be extended to smaller elements of the problem (Petty, 1997:79). Every kind of a creative-work assignment comprises parts and a whole. In graphic design a visual concept usually consists of smaller elements such as line, tone, color, composition, symbols and content. Each part has its purpose and contributes to the whole. Each of these aspects needs to be clarified during the creative process to ensure that it serves the purpose which was decided on. Determining what contribution a particular part makes to the whole and in which way it contributes to achieving the main purpose of the task is an essential aspect of the Clarification phase (Petty, 1997:79).

Petty (1997:117) describes the ideal mind-set for the Clarification phase as 'strategic, unhurried and impertinent'. Being strategic implies that one should distance oneself from a task from time to time and look at it in an objective, logical and analytical way while asking the set of clarification questions mentioned above. Being unhurried during the Clarification phase implies a patient mind-set which avoids rushing into the problem without analyzing and understanding it fully. Petty (1997:118) observes that it requires an unhurried mind-set to distance oneself from a piece of work and to ask, 'what exactly am I trying to do here?' He notes that clarification may take about five percent of the time one spends on creative work but it saves much more time than the act of clarification itself requires. Clarification ensures that the activities undertaken are pointed towards the right direction and it helps one to decide quickly between alternative ideas. Lastly, the 'impertinent' mind-set requires that one cultivates an independence of mind which continually questions accepted practice and be prepared 'to think things out from scratch' (Petty, 1997:118).

The process of clarification could also be applied at a personal level. Petty (1997:179) emphasizes the importance of intrinsic motivation in the creative process and recommends that individuals clarify their own self-defined goals during and before working on a creative assignment. Focusing on one's personal objectives for engaging in a creative task stimulates an individual's intrinsic motivation. The relationship between high levels of intrinsic motivation and creativity has been demonstrated by the researcher Theresa Amabile (1983; 1996) and discussed in Chapter 3. Amabile's research indicates that when individuals are driven by intrinsic motivation they enjoy the work for its own sake and will tend to maximize both the effort and the time spent on the task (Amabile and Hennessey, 1992:55). Thus, when an individual clarifies his/her personal objectives for engaging in creative work, these objectives fuel the creative process to ensure high levels of creative ability. According to Petty (1997:115) extrinsic and intrinsic objectives are important:

Extrinsic objectives express necessities and constraints, while intrinsic objectives describe where you want to go despite these constraints. You must have both intrinsic and extrinsic objectives, or you will lose sight in your real purpose.

Personal clarification may be done by means of a 'personal manifesto' which answers to questions such as the following (Petty, 1997:95):

- Why did I choose graphic design as a career?
- What do I think is the most important facet to achieve as designer?
- What gives me most enjoyment in my work?
- What do I want to achieve with this assignment?

It is possible to meet the extrinsic requirements of an assignment *and* achieve these personally defined goals, but only if one has personally defined the answers to these questions and set them as personal objectives to achieve. Petty (1997:95) notes that answering these questions are 'hugely challenging and may require deep thinking'. They are however vitally important extensions of the purpose-finding process, since, as Petty (1997:180) phrases it: 'Only what *you* value can really inspire you. Your values are your ultimate purposes and your ultimate motivators.'

To conclude: it seems that having a clear purpose in mind – whether intrinsic or extrinsic – is an indispensable component of the creative process. Each of the clarification activities serves a particular purpose: *defining a problem* creates a focus for creative work; *gathering information* ensures that the problem is understood from many different perspectives and *clarifying intrinsic objectives* for engaging in creative work ensures personal drive and motivation to work creatively. All of these activities require a rational and analytical mind-set. The next phase in Petty's model, the Inspiration phase, utilizes a completely different mind-set.

PHASE 2: INSPIRATION

This phase in the creative process bears similarities to the Illumination phase which was first described by Wallas (in de Beer, 1993:46-48) in his early model of the creative process. The original CPS model refers to this phase as 'Idea-finding'. In Treffinger's *et al.* (2000:15) transformed version of the CPS model it is described as the 'Generating Ideas' phase. The phase is synonymous with ideation and refers to the deliberate generation of ideas and possible starting points for solutions to a problem. Essentially this phase is recognized by most authors as the phase in which an individual employs divergent thinking processes to generate as many as possible verbal and visual triggers that could lead to a creative solution. It is the stage during which the typical 'aha' moment in the creative process occurs – the moment when an individual generates an idea and recognizes its creative potential. This phase is often preceded by a Clarification phase during which the central objective, information and parameters of a problem are identified. This phase usually needs to be followed up by other phases which either select the best idea among others (the Distillation phase), explore the full creative potential of an idea (the Perspiration phase) or allow an idea to be developed subconsciously (the Incubation phase).

The main 'tools' for executing the Inspiration phase are the divergent thinking techniques that were proposed in Chapter 7. The effectiveness of these techniques to generate ideas in

graphic design was demonstrated by means of examples in Chapter 7. The proposed techniques comprise the following:

- **Random Association:** This technique embraces a process in which different words, images or objects are randomly chosen and juxtaposed with a keyword of the problem statement, the aim being to open up new ideas around the chosen focus.
- **Morphological Synthesis:** This technique entails a process by which a problem or a central theme of a problem is divided into categories, dimensions or main attributes. A matrix existing of rows and columns is drawn, the different categories are written at the top of the columns and each category is then further broken down into attributes, associations or features. Words are then connected across the matrix to facilitate innovative combinations of concepts.
- **Metaphors and Analogies:** In analogical thinking, similarities between two different universes of meaning are explored and ideas from one context are transferred to another in search of parallels, insights, fresh perspectives or new syntheses.
- **Mind-mapping:** This technique aims to extend a concept as far as possible using a map-like structure which facilitates an easy flow of ideas.
- **Idea Checklist:** This technique embraces a process by which an individual uses a list of key questions as catalysts to transform existing ideas or to spark new ideas.
- **Visual Thinking:** This technique implies that an individual substitutes words with quick drawings or symbols to express the thinking process involved in creative problem solving. The technique helps to generate visual solutions to a problem.
- **Sense Connections:** This technique focuses on the five senses of sight, sound, taste, touch and smell as starting points for the generation of ideas.

As it was indicated in Chapter 7, these techniques are particularly useful for implementation into the context of graphic design. However, a plethora of other techniques is to be found on the Internet and in various sources on creativity (e.g. Cave, 1999; Michalko, 1998a; de Bono, 1993; Couger, 1995; Eiffert, 1999; Parnes, 1992b). Thinking strategies to facilitate the Inspiration phase are probably the most frequently documented in literature on creative thinking.

The creative potential of these techniques seems to be maximized when an individual adopts a particular mind-set while implementing the techniques. Petty (1997:19) describes this mind-set as follows: 'In order to generate a large number of different ideas you need to be deeply engrossed, fearless and free: spontaneous, risk-taking, joyful, "slaphappy", intuitive and

improvisational'. He warns that it is 'inappropriate' to employ a rational and logical mind-set during this phase. The logically orientated mind-set which is useful for phases such as the Clarification or Distillation phase differs significantly from the carefree, playful mind-set which is most supportive of the Inspiration phase (Petty, 1997:19)). During the creative process it is imperative that individuals consciously shift from one mind-set – which is the most effective mind-set for a particular phase – to another. The skill of purposefully adopting the 'correct' mind-set for each phase of the creative process seems to be the essence of managing the creative process effectively.

Ideally, the Inspiration phase should entail an uninhibited, spontaneous, experimental and exploratory search for ideas without being fearful to take risks (Petty, 1997:29). The aim is to unleash one's imagination rather than to generate the perfect solution (Petty, 1997:29). When divergent thinking techniques are employed to facilitate idea generation, the emphasis should be on play (Marra, 1990:110). Various techniques should be viewed as 'toys' for stimulating one's creativity (Marra, 1990:110). Brown (2004:705) even recommends that real toys could be brought into the environment where ideas are generated. He argues that the toys, especially funny toys, give people a harmless and humorous way to blow off steam and sometimes introduce an element of levity into tense situations. Toys that make squeaky sounds or do interesting movements could induce a sense of play and cause laughter, thus establishing the ideal mind-set for idea generation. They may even be used as 'random stimuli' for the execution of the Random Association technique. These recommendations are in line with the suggestions made in Part 1 regarding the importance of a lighthearted, playful and relaxed mind-set as an essential frame of mind for creative thinking (Amabile, 1983:27). Amabile (1983:27) associates this mind-set with intrinsic motivation.

Petty (1997:63) believes the success of the Inspiration phase is to a large extent dependent on qualities and abilities associated with the following mind-sets:

- **receptiveness:** the ability to adopt a playful curiosity towards unusual ideas, to ask what they have to offer, rather than condemning them as impracticable;
- **acceptance:** the ability to accept ambiguity, vagueness and incompleteness – to ask 'why not?' instead of 'why?';
- **optimism:** to focus on the potential and workable aspects of ideas instead of focusing on paradoxes and problems.
- **being uncritical:** the ability to tolerate mistakes and 'silly' ideas. Petty states: 'If most of the ideas you create are workable, then you didn't take enough risks'.

An integral part of this mind-set is the deliberate implementation of two divergent thinking principles, initially proposed by Osborn (1992:4) as part of his brainstorming procedure.

Firstly, it is important that *judgment* of ideas should be deliberately avoided (or 'deferred') and secondly, one should aim to achieve a large *quantity* of ideas. The 'ground rules' for this phase, according to Treffinger *et al.* (2000:44) is to allow ideas to flow freely without reacting to them, judge them or debate their merits or demerits. The goal is to generate as many, as varied and unique as possible ideas (or starting points for ideas). According to Marra (1990:97) the ideal way to defer judgment is to avoid saying 'yes' or 'no' to ideas as they emerge. When one passes judgment too early, blocks to future ideas spring up immediately. If one say 'yes' to an idea too soon, one is denied the possibility of finding a better idea. If one says 'no' too soon, the possibility of reshaping or rethinking initial ideas is denied. What may at first glance seem to be a dull and impracticable idea is never allowed the opportunity to grow into an exciting and workable one. Creative ideas often originate in a rough and incomplete form: they may start with a word, a term or an image that seems promising but is still totally underdeveloped. Then gradually, over time, the creative mind molds and polishes ideas, ultimately shaping them into completion and greatness (Marra, 1990:97). The refinement of ideas usually takes place during later phases of the creative process. The Inspiration phase is essentially aimed at the optimization of mind-power to trigger as many as possible *starting points* for creative ideas.

Although divergent techniques may be effective in facilitating idea generation, it is essential that students have a thorough understanding of the mechanisms and creative potential of the techniques before they use it. To be effective, individuals must be prepared to 'master' the techniques through practice, training and instruction (de Bono, 1993:190). Essentially these techniques aim to expand an individual's perception of a creative problem. During this process of expansion it is aimed at to facilitate the generation of multiple view points, related words, concepts or unrelated words that could trigger creative ideas. If students become acquainted and master these techniques by experimenting and playing with them on a regular basis, they are likely to develop confidence in the technique's potential to trigger innovative ideas. Such confidence is essential to ensure a bold, risk-taking and fearless mindset as described previously in this chapter.

Although the Inspiration phase is significant to provide the 'break-through' trigger which could lead to a creative solution, it is dependent on other phases such as the Distillation and Perspiration phases to develop creative ideas to their full potential. The following section explains the importance of the Distillation phase to achieve the most appropriate solution for a creative problem.

PHASE 3: DISTILLATION

The Distillation phase refers to the phase in the creative process during which a selection (or a distillation) is made among a number of ideas that evolved as a result of the Inspiration phase. The process of distillation enables one to choose the most effective solution for a creative problem. During this phase ideas from the Inspiration phase are sifted, usually in the light of the findings of the Clarification phase. The process of selection to determine the most effective solution for a creative problem is also recognized as an essential step in other models of the creative process. The Couger variant of the *Osborn-Parnes model for creative problem-solving*, for example, combines the process of evaluating and of prioritizing ideas (selecting among ideas) as one step before the final implementation of the idea (Couger, 1995:119, Annexure P). Petty's model divides the practice of evaluation and distillation into two separate steps while the 'classic' CPS model (Annexure O) regards the selection process as part of the final Solution-finding phase.

The effective utilization of divergent thinking techniques during the Inspiration phase is likely to generate a number of ideas that have creative potential. Generally, selecting among them to decide on a creative solution may seem to graphic design students a reasonably uncomplicated and straightforward task in comparison to other phases in the creative process. Petty (1997:120-121), however, warns that it is precisely this seemingly undemanding appearance of this step in the creative process that may cause individuals to select ideas with less creative potential. He notes that during the Distillation phase, individuals are frequently tempted to select ideas which are

- similar to ideas which have worked in the past;
- relatively free of problems or errors;
- the most fully worked out.

This playing-safe strategy risks the rejection of original ideas which may seem problematic but dispose of more creative potential. Truly creative ideas are often raw and may seem to have difficulties, but if these could be successfully addressed the result may be more original and striking than a safer idea with no apparent difficulties.

Petty (1997:120) identifies two vital guidelines for decision making during the Distillation phase which are based on the concepts of 'promise' and 'purpose'. These two guidelines could be implemented by asking the following two questions: 'Where will this idea take me?' (promise) and 'Is that where I want to go?' (purpose). The importance of the first question which embodies the creative potential of an idea is that ideas should be evaluated according to their *latent embedded possibilities* and not according to their undeveloped state. It is essential that students should realize that ideas that were generated during the Inspiration

phase are only starting points for concepts that need to be explored until they reach their full creative potential. Petty (1997:120) emphasizes that during the Distillation phase 'it's not the ideas you should be judging, it is where the ideas could take you what needs to be evaluated'. If one is not sure what idea may yield the most creative solution to a problem, Petty (1997:123) recommends the use of a low-investment Perspiration phase – that is, a short exploratory session for each idea to determine its respective creative potential. Only by exploring ideas one may discover their potential. The most common error during the Distillation phase is to condemn ideas without exploring them further (Petty, 1997:125).

The second guideline for decision making during the Distillation phase focuses on the purpose of a creative solution and is equally important in this phase. If one does not have enough clarity about the main objective of a creative assignment, it may be helpful to implement a short Clarification phase (Petty, 1997:123). Once it is clarified what exactly needs to be achieved with a creative project then the Distillation process often becomes simpler. Distillation and Clarification can be mutually supporting phases in the creative process (Petty, 1997:123). Although the desired mind-set for the Distillation phase requires objective analysis and judgment against clearly defined goals, Petty (1997:20) warns that one should not be so critical during this phase as to inhibit creative productivity. The ideal mind-set for the Distillation phase seems to be dual in character: on the one hand a strategic, logic and rational mind-set is required to analyze the appropriateness of an idea. On the other hand, a playful, bold, optimistic and even risky mind-set is necessary to ensure that ideas with the most creative potential are selected. Petty (1997:20) summarizes this mind-set as follows: 'one needs to be realistic but ready to take on challenges at the same time'.

Decision making during the Distillation phase may be aided by the use of a criteria checklist (Petty, 1997:123). This list may include criteria focusing on qualities such as simplicity, clarity, honesty, originality and fitness for purpose. Meeting these criteria may help to discern other qualities. Clarity and simplicity may, for instance, result in a sense of power and immediacy. Fitness for the intended purpose may in turn provide effectiveness (Petty, 1997:123). Although guidelines for the development of distillation criteria may be provided to graphic design students, they could also be encouraged to develop *their own list of criteria* to use during Distillation phases. The importance of cultivating a sense of independence in students in order to enhance their creativity has been pointed out in Chapter 4. Although it may be helpful to consult others (lecturers, peers, clients) during the Clarification phase to aid in the decision-making process, ideally students should develop an ability to trust their own judgments.

Graphic design students' ability to effectively implement the Distillation phase seems to be an essential aspect of managing the creative process maximally. The process of distillation may be aided or interrupted by the implementation of other phases such as the phases of Perspiration, Clarification or even Incubation. The following section explains how the Perspiration phase could be managed to obtain maximum creative output.

PHASE 4: PERSPIRATION

According to Petty's model the Perspiration phase refers to the phase during which an individual works determinedly and persistently on one or more ideas to explore and maximize its/their creative potential. The acknowledgement of this phase as a distinctive and separate step in the creative process is unique to Petty's exposition of the various phases of the creative process. Other models of the creative process such as Wallas's model proceeds from the Illumination (idea-generating) phase to the Verification (evaluation) phase with no particular reference to the further development of an idea. The *Osborn-Parnes model for creative problem-solving* does suggest that ideas may be 'strengthened' after the Idea-generating phase (during the fifth step, 'Solution Finding'), but do so by means of evaluating and prioritizing ideas rather than by elaborating on them as in Petty's model (Couger, 1995:119).

Petty's model, however, views the Perspiration phase as an essential step which is usually employed after the Inspiration phase. Ideas which were generated during the Inspiration phase are merely viewed as a *point of departure* that may lead to the final solution of a creative problem through a process of hard work and dedication (Petty, 1997:131). Petty's approach to the creative process is essentially task-orientated and less idea-oriented – as in the other models. This task-orientated approach of Petty's account of the creative process is highly applicable to the context of graphic design. In the discipline of graphic design which requires the transformation from a verbal concept into a visual product, incorporating a phase that acknowledges the need to explore and expand on ideas before implementation seems indispensable.

This notion of invested effort as a requirement for creativity may appear straightforward, but as Houtz (2003:28) points out, not long ago creativity was viewed as independent of effort. Historically, creative genius has been considered by some people to be inborn and insights in particular were defined as spontaneous and sudden (Houtz, 2003:28). It is a common stereotype that creative people are uninhibited and impulsive (Dacey and Lennon, 1998:116). However, Petty (1997:135) points out that researchers with expertise in the field of creativity emphatically agree that the notion of creativity which 'comes in a flash' is untrue

and a simplification of the creative process. The view that creative achievement does not result from the proverbial 'light-bulb' in the mind but requires sustained effort and a large investment of time and energy to be realized is increasingly being promoted by contemporary debate on this issue. Thomas Edison's widely quoted remark that creativity is 'one percent inspiration and ninety-nine percent perspiration' affirms these views (quoted in Simonton, 1997:23). The fact that creative achievements demand – among other phases – a phase of hard work and immersion into a problem is evidenced by numerous examples of well known creative thinkers in the past (such as Beethoven, Edison, Newton, Van Gogh) whose creative achievements resulted from perseverance, experimentation and many preliminary studies (Dacey and Lennon, 1998:116).

The main tools to be applied during the Perspiration phase are drafts and redrafts which can be amendments of old drafts or 'clean slates'. Drafts may be used to work on a single idea or in instances where more than one idea seem promising, both may be explored by means of a process of 'parallel development' (Petty, 1997:138). It is often difficult to know where an idea might lead to until one has developed it further. Petty (1997:69) warns against premature acceptance of ideas. During the Perspiration phase one should not allow difficulties or mistakes to reduce one's faith in ideas. A draft which explores every avenue of an idea will inevitably include avenues that turn out to be dead ends. Petty (1997:138) notes that 'dead ends and mistakes are the inevitable consequence of an open-minded exploration'. Students should know that the aim of a draft is not to produce work which is relatively free of mistakes or inconsistencies. Drafts and redrafts should be viewed as an experimental exploration to discover an idea's richness and full potential (Petty, 1997:131). To maximize the creative potential of an idea, employing the Idea Checklist technique (Annexure L and M, Chapter 7) may be effective. When a list of 'triggers' (such as 'combine', 'fragmentize', 'superimpose', 'repeat') is used as catalysts to transform existing ideas, it ensures a variety of creative approaches to a concept.

Learning how to view mistakes and difficulties occurring during the drafting phase is vital to the success of the Perspiration phase (Petty, 1997:132). Creative people are often uncertain or self-critical and tend to see mistakes as manifestations of a lack of talent, instead of viewing mistakes as emphasizing the need for more work or a different approach (Petty, 1997:132). Petty (1997:140) is a firm believer of the notion that creative successes result from 'perseverance and persistence in the face of the difficulties'. He refers to Matisse's work, which despite the spontaneous childlike appearance of many of his paintings, was always the result of long meditation and many preliminary studies. Matisse completed twenty two versions of his well known work, *The Pink Nude* (1935) before he was satisfied with the end result which paradoxically, was acclaimed for its spontaneous appearance (Petty,

1997:153). Likewise, Thomas Edison failed thousands of times to produce light by means of electricity. It was his persevering mind-set that enabled him to find a way that worked. Despite his many failures, Edison maintained an optimistic mind-set, stating that he had 'a huge advantage over his rivals in knowing so many ways that did *not* work' (Michalko, 1998a:45).

It is this kind of optimism that Petty (1997:137) believes is an essential mind-set to adopt when facing difficulties during the Perspiration phase. He refers to this mind-set as 'responsiveness' and requires that one who reflects on a problem should remain boldly uncritical, positive and enthusiastic about an idea's creative potential while drafting (Petty, 1997:140). A responsive person views a difficulty as a challenge to his or her inventiveness and a failure as an opportunity to learn. A responsive approach attempts to determine the reasons *why* difficulties and mistakes occur. Likewise a responsive approach optimistically seeks strategies or techniques to overcome difficulties. Furthermore, a responsive individual assumes a solution is attainable – it is only a matter of working out how to achieve it (Petty, 1997:143). In this respect Petty (1997:143) remarks: 'Responsiveness works. It is the only functional and emotionally intelligent approach to creative problem solving'.

This mind-set is also typical of the kind of intrinsic motivation advocated by Amabile (1992:55) to be an essential requirement for high levels of creative ability. In Chapter 3, intrinsic motivation and the advantages of a playful, enjoying mind-set for creative exploration were metaphorically likened to the experience of being in a maze: if one *enjoys* the process of searching for an exit to the maze, one would be less inclined to follow the most direct path to the exit but would delay the exploration process to discover more creative paths to leave the maze (Deci and Ryan, 1992:70). This metaphor suggests that creativity is maximized when an individual adopts a mind-set that focuses on the elements of play and enjoyment in the creative process. Such a mind-set ensures that the person persists, tolerates ambiguity and stays optimistic until he/or she succeeds. Being able to tolerate ambiguity has been recognized as an important ability to sustain creative energy. Sternberg (2004:201) points out that when individuals do creative work, they often find that in the early or even sometimes late stages of the creative process, ideas do not work out the way they seemingly should. He says one sometimes goes through prolonged, uncomfortable stages of ambiguity, where things just do not quite fall into place. Yet he asserts, in order to be creative, one needs to tolerate ambiguity long enough to succeed.

The opposite of a responsive attitude is a 'defeatist' attitude (Petty, 1997:142). This approach assumes that a failure or difficulty is due to a personal deficiency such as a lack of talent, or it is due to external circumstances which cannot be changed – such as an inherent weakness

in the idea. Petty (1997:142) warns that the danger of a defeatist attitude is that it tends to be self-fulfilling: if one does not believe in an idea one tends to give up prematurely and the idea fails because of this lack of commitment, long before any inherent weakness in the idea has proved serious. Conversely, if one suspends criticism and remains positive and optimistic, one tends to keep seeking for solutions and is much more likely to overcome difficulties.

To maximize creative ability during the Perspiration phase Petty (1997:140) suggests that work sessions should be well planned. It is important to establish conditions to ensure that creative sessions are enjoyed optimally. However, conditions optimally efficient for creative work may differ from person to person (Van Demark, 1991:223). One person may find music helpful, whereas another may prefer complete silence. One may like nature and outdoors settings; another may prefer an indoor setting. Nevertheless, one should strive to work in an environment that supports creativity – including facilities and equipment that offer comfortable and pleasant physical conditions, such as temperature, light, décor, work-space, convenience and etcetera. Achieving these ideal conditions may be difficult to attain in an educational setting where the inconveniences of noise, limited space and infrastructure are often unavoidable. Still, if students are aware of the fact that they should choose their mind-sets and own working environments carefully to support their creativity during the Perspiration phase, it may be the first step in increasing levels of creative productivity.

The various phases in Petty's exposition of the creative process are not intended to be implemented chronologically. Petty (1997:20) emphasizes that one should switch from one phase to another as the need arises. The Perspiration phase should ideally involve short Clarification and Evaluation phases between drafts (Petty, 1997:134). Clarification entails that before or during each subsequent Perspiration session (redraft) one needs to determine (or recall) the main objective of the work. Evaluation entails altering the work in positive response to the preceding Evaluation sessions. The Perspiration and Evaluation phases are very different in intent and almost opposite in mind-set. Drafting applies a mind-set similar to the Inspiration phase – an engrossed, enthusiastic and uncritical predisposition focused on the realization of potential and not on the avoidance of 'error' (Petty, 1997:132). The mind-set associated with Evaluation on the other hand (described in more detail in the next section), should strive to be detached and critical. Petty (1997:132) warns that it is tempting but 'fatal' to adopt this critical mind-set during the Perspiration phase. Judgment should be deferred until ideas have had a chance to develop to their full potential.

In sum, it seems that adopting a persistent optimistic mind-set during the Perspiration phase is essential to allow cognitive processes to proceed from obstacles, lethargy and discouragement to the successful production of a creative product. Acknowledging the need

to invest time, hard work and energy to achieve creative results seems to be the first step to this realization. In Reynard's words (quoted in Houtz, 2003:101), 'Talent does not write one page: it writes three hundred.'

PHASE 5: EVALUATION

The process of evaluation – where work is examined for strengths and weaknesses – is generally acknowledged as an integral and indispensable part of the creative process. It is important not to employ the Evaluation phase too early in the creative process before ideas have been given full opportunity to be brought to fruition. Premature evaluation may condemn ideas before they have had a chance to prove their creative potential (Petty, 1997:158). Petty's exposition of the various phases in the creative process is approached from a self-empowerment perspective enabling the course of action to be purposefully managed to maximize creative ability. Although it may be effective for external evaluation, Petty's proposed evaluation methods and mind-sets are therefore particularly useful for self-evaluation. The importance of effective self-evaluation as part of the self-regulatory process to optimize creativity in graphic design students has been pointed out in Chapter 4 of this thesis.

Petty (1997:145) proposes a pragmatic three-step approach to the Evaluation phase. This process employs the three questions 'what?', 'why?' and 'how?' according to the following method:

- *What*: The evaluation process of a creative work should start with a reflective process that determines *what* aspects or elements work well (for example, the composition or the color scheme) and *what* areas present weaknesses (for example, readability of the typography).
- *Why*: The next step aims to understand the reasons *why* strengths are considered strong and weaknesses weak. This step of the evaluation process is an important learning tool: students may learn from their mistakes but also from their successes. For example, if a student concludes that the type does not work because of a lack in contrast he or she learns more about the principles of contrast and type as well as how to solve the problem.
- *How*: Finally, asking *how* to capitalize on the strengths and how weaknesses may be reduced provides the basis for decisions that can be implemented during the next Perspiration phase. Asking this kind of questions also provides an opportunity for learning. During this phase it is important to adopt a ruthless approach to the 'culling' of weak elements in a work (Petty, 1997:160). Reluctance to eliminate elements in fear of losing their good qualities may prevent the work from improving.

This technique may help students to structure their thinking during the evaluation process and could be effective for those students who feel insecure about how to approach the process of self-evaluation.

As in the instance of the other phases, Petty (1997:161) recommends that individuals adopt a specific mind-set to ensure the effectiveness of the Evaluation phase. However, he acknowledges that the ideal mind-set for the process of evaluation is a 'difficult mix': one should be *critical* and *positive* at the same time. Being positive during this phase is extremely difficult since deficiencies and weaknesses have a natural tendency to shout down the strengths. Ideally one should celebrate the positive aspects of a work to maintain enthusiasm and motivation while one acknowledges the weaknesses (Petty, 1997:63). An important aspect of a positive mindset during the process of evaluation is being willing to view mistakes as valuable opportunities for learning and improvement. Creative people often tend to experience criticism as a threat and so fail to improve their work (Petty, 1997:20). Ideally, evaluation should be seen as a 'safety net' which allows the Inspiration and Perspiration phases to be completely free.

One of the most important skills to acquire while evaluating creative work is to detach one's ego from the work (Petty, 1997:158-163). Since creative work is often a subjective experience, graphic design students may feel that their *person* is being criticized when weaknesses in their work are pointed out. During this process of evaluation it is important to realize that one is criticizing the draft work and not oneself. It is especially unproductive to question one's own talent or skills on the basis of unsuccessful work. To overcome the natural tendency to be defensive during this phase, Petty recommends that students pretend as though someone else did the work for them and that they (the students) should decide whether the work done by these other people meets the standards originally set by the students themselves. If someone's ego is too strongly attached to his/her work, criticism will be resented and one may stunt the progress of the work. The balance between the critical aspect of a mind-set, associated with the Evaluation phase and the positive aspect of such a mind-set is vital and difficult. Still, it seems important that students should strive to remain in control of their own emotional reactions to their work.

In order to employ effective self-evaluation it is essential that students develop a sense of independent judgment. Experts on creativity are emphatic about the importance of independence of mind as a requirement for creative ability. Rogers (in Starko, 1995:252) refers to this independence of mind as an 'internal locus of evaluation'. This internal locus implies that students should be able to develop a set of their own standards that could be used to judge their work. Setting evaluation standards for themselves may require that

students have to think sincerely about aspects such as the ultimate aim of a piece of work as well as their own goals and personal aims (Petty, 1997:155). Some of these questions may have been addressed during the Clarification phase. Introducing a short recap of aims and objectives established during the Clarification phase may therefore be useful during the process of evaluation. Responding to work in terms of 'likes and dislikes' are problematic – it is more important that creative work fulfills its purpose which were decided on during the Clarification phase rather than the creative work being 'liked' by the creator (Petty, 1997:155).

Although the process of evaluation may be employed several times during the creative process and could be used to interrupt a Perspiration phase, Petty (1997:158) warns that it is essential to avoid working continually with a critical, evaluating mind-set during the Perspiration and Inspiration phases. A critical mind-set may interfere considerably with an optimistic, 'defer-judgment' mind-set which is recommended for these phases. It is therefore more productive to purposefully *separate* the Evaluation phase and its critical mind-set from these other phases. The phases of Perspiration and Evaluation are 'complementary opposites' (Petty, 1997:158). It is important to keep in mind the crucial distinction between 'what might be' during the Perspiration phase and 'what is' during the Evaluation phase. Phases of Perspiration and Evaluation' often alternate to form a cycle aimed at gradual improvement (Petty, 1997:18). Individuals should carefully monitor their mind-sets during these phases and ensure that they are using the correct one (Petty, 1997:163). The two different mind-sets associated with the Perspiration and Evaluation phases are summarized in Table 6 (Petty, 1997:159).

Table 6: Summary of the two different mind-sets of the Perspiration and Evaluation phases

Perspiration	Confident, even arrogant about the vision	Forward-looking: focused on realizing <i>what might be</i>	Engrossed in the work in progress	Tends to be focused on detail	In both phases one should be committed to the vision of what might be and one's ability to realize it
Evaluation	Humble about how the vision has been realized	In retrospect: focused on evaluating <i>what is</i>	Detached from the work in progress	Focused on the big picture and whether the detail realizes it	

As in instances of the other phases of the creative process, the Evaluation phase may last anything from a few seconds to many days (Petty, 1997:144). If time allows to spread an

Evaluation phase over more than one day, it may be useful combining it with the next and final phase in Petty's model, that is Incubation.

PHASE 6: INCUBATION

Incubation is the term used for the *subconscious* generation of potential solutions to a given problem. This phase refers to the phenomenon that problems are either intentionally or unintentionally left unattended for a certain period (e.g. overnight) to allow the subconscious to 'work' on a matter. Incubation implies that when an individual is mindful of a specific creative problem, the subconscious attempts to solve that particular problem by making associations or 'searching' for analogies that may present an answer to the problem (Petty, 1997:165). Such an answer may appear unexpectedly while the problem-solver is relaxing, at night or on awakening in the morning. Incubation is commonly acknowledged as an integral dimension of the creative process and was included in some of the earliest models of the creative process such as Wallas's four-step process (in de Beer, 1993:46-48). Although incubation is not incorporated as a separate step in the CPS model, it is recommended as a technique to aid idea generation during the execution of the CPS process (Parnes, 1992a:140). De Bono (1993:87) refers to incubation as the 'creative pause'. Petty's (1997:164-176) model describes incubation as a valuable phase to employ deliberately from time to time during the course of the creative process. It points to the need for periods of relaxation and rest between creative activities to maximize the chances for creative idea-generation. Indeed, Runco (2004:662) points out that sufficient time for creative work is an important resource for creativity.

Eric Maisel (2000), a psychotherapist and creativity consultant who mainly focuses on night-time incubation as a problem-solving technique refers to incubation as 'sleep thinking'. Essentially, sleep thinking refers to the brain's ability to subconsciously process thoughts and make connections or associations while one sleeps in an attempt to solve problems attended to during periods of consciousness (Maisel, 2000:3). According to Maisel (2000:2) sleep thinking occurs primarily during NREM (non-rapid eye movement) sleep when the quality of sleep is at its deepest, while dreaming occurs during REM (rapid eye movement). He points out that for many years it has been believed that no mental activity occurs during NREM sleep, but although little scientific work has been done on sleep thinking yet, scientists (e.g. David Foulkes quoted in Maisel, 2000:2) have discovered that a considerable amount of high-level activity, including thinking and problem solving occurs during these phases of sleep. Often, after a period of incubation a solution to the problem surfaces the next morning. Isaac Newton (quoted in Petty, 1997:165) who always worked on a difficult problem just before he went to sleep reported that, 'I invariably woke up with the solution'. The

unconscious mind seems to be able to sort and organize information into patterns that are conducive to problem-solving. In this regard Glover (1989:179) observes the following:

Just as the organism pulls together random, formless stuff into the patterned system of structure and function in the body, so the unconscious mind seems to select, arrange and correlate ideas and images into a pattern.

Although Petty's (1997:167) description of the Incubation phase acknowledges Maisel's account of incubation as a process that manifests as 'sleep thinking', he argues that very deep sleep is not necessarily needed for incubation. He notes that creative thinking is generally associated with two types of brain waves namely 'alpha' and 'theta' waves which are not known to be generated during NREM sleep. Petty explains that alpha waves are generated during relaxation, meditation, daydream or reverie. Generating alpha waves implies a state of 'relaxed alertness', which is thought to facilitate intuition and inspiration, because it allows contact with the subconscious. Theta waves which are slower than alpha waves are produced during deep meditation or when one is close to sleep. Theta waves have also been linked to creativity. Although Petty does acknowledge the benefit of 'sleeping on a creative problem', he points out that incubation is not restricted to sleeping. He notes that the subconscious may also work productively on problems during other periods of rest and relaxation.

Referring to Wallas's four-step explanation of the creative process, Dacey and colleagues (1998:196) speculate about a neurobiological basis for the two constructs of 'illumination' and 'incubation' in Wallas's model. They base their arguments on research conducted by David de Wied (quoted in Dacey and Lennon, 1998:197) on a certain neurotransmitter, the adrenocorticotrophic hormone (ACTH). De Wied proposes that ACTH neuro-peptides act as vehicles that aid communication between neurons. They also influence the potential for active transmission of impulses between the brain's two hemispheres which in turn fosters communication between the two hemispheres. This hormone increases during times of external stimuli and decreases during low levels of activity or stimulation (e.g. while sleeping or daydreaming). Thus, in process of incubation, when the conscious mind is less active, less ACTH is secreted. These hormonal relationships have suggested a biological model of the creative process to David de Weid (as quoted in Dacey and Lennon, 1998:197). This 'downtime' may allow the brain to regenerate the ACTH that ushers forth creative ideas in the process of illumination. If, as Wallas has suggested, the process of incubation precedes illumination as a necessary step in the creative process, then it seems reasonable to assume that ACTH secretion will escalate during periods of actual creative output.

Further evidence for the ACTH hypothesis is suggested by Martindale and colleagues (quoted in Dacey and Lennon, 1998:198), who found that during states of low cortical

arousal, creative individuals are more likely to experience a decrease in conscious attention (probably what Wallas meant by his incubation phase). Martindale (quoted in Dacey and Lennon, 1998:198) contends that during this state of 'defocused attention', neurons are simultaneously activated, interacting with other neurons in ways that are considered critical for the formation of new ideas. This period of low arousal also depends on low interest in environmental stimuli, such as when a person is daydreaming or is just about to fall asleep. At such times, unobstructed access to the subconscious allows individuals to tap into old ideas or fantasies that can provide fertile ground for creative insights. Maisel (2000:11) agrees that during the night, larger neuronal gestalts are formed, that is, more neurons are freed from their customary duties and can band together, forming a large mass of neurons that can deal with problems and questions. He points out that the essential difference between normal thinking and sleep thinking is both the *quality* and the *quantity* of the brain work involved. Since normal thought is often interrupted by small daily events, conditions for problem solving is not as ideal as at night when the larger 'databases' of our minds are accessed. Links may thus be formed that are overlooked when one searches consciously for relationships.

For incubation to be effective it seems essential to engage deliberately into the problem before periods of rest and relaxation (Parnes, 1992a:141). Cave (1999) suggests that one should first 'saturate' oneself with a creative problem before one deliberately breaks with it. Hiam and Chalkley (1998:35) say the secret to incubating ideas is revisiting the problem and doing so often. According to them, one has to keep working at it, renewing focus and re-intensifying efforts with each return visit. They emphasize that it is vital not to lose touch with the problem. They describe this mind-set as follows:

You should always have a low-level awareness of it and be able to 'feel' its presence in your mind. That only happens if you put significant mental energy into the problem beforehand. Just toying with a problem is a superficial activity: Nothing sinks into your mind, so when you set the problem aside, there's nothing to incubate!

Petty (1997:169) agrees that a 'prepared mind' is essential for the process of incubation to be effective. He says the first step to incubation is to review a creative task thoroughly, paying attention to any inconsistencies or unresolved problems (Petty, 1997:168). This reviewing may be done a few minutes before going to bed at night. The next step is to frame a clear statement of what one needs in order to proceed, starting for example with 'I need a way to...' (Petty, 1997:168) The way in which such an 'incubation statement' is formulated seems to be crucial to the effectiveness of the technique (Maisel, 2000:36). Ideally such a statement should reflect optimistic faith in the attainability of a solution. For example, a statement such as 'I *cannot* solve this problem' must rather be posed as 'I *wonder* how I can solve this problem' (Maisel, 2000:77).

Maisel (2000:36) regards incubation to be effective on condition that there is as little as possible anxiety about the problem to be solved. Sleep should preferably be entered meditatively, quietly 'wondering' about the problem at hand rather than stressing about it (Maisel, 2000:77). The underlying feelings and tones reflected in the way a problem statement is being posed should be that of hope, optimism and affirmation (Maisel, 2000:77). Petty's (1997:170) description of the ideal mind-set for the Incubation phase corresponds with Maisel's suggestions. He describes the ideal mind-set as 'unhurried, trusting and forgetful'. One should not attempt to force the pace of creative work. Anxiety about deadlines (for example) will be counter-productive if it makes it difficult to 'forget' one's work. It is essential that one relaxes, ponders the problem playfully and trusts that sooner or later the solution to the problem will occur (Petty, 1997:168). Under these conditions the unconscious mind seems to be most receptive to solving problems during periods of sleep. Furthermore, individuals should not dismiss the technique of incubation if a problem is not solved overnight, but should continue to believe in their mind's ability to solve a problem.

It is common for thoughts which have been generated during the night to surface into consciousness when one wakes up in the morning. Maisel (2000:38) suggests that one should allow a few minutes after waking up to allow the brain to illuminate answers that it may have found during the process of sleep. It is, however, not uncommon to be awakened by incubation thoughts in the middle of the night. When this happens it is essential to respond to the thinking process and record it immediately (Maisel, 2000:38). Parnes (1992a:141) points out that creative solutions which result from incubation tend to surface into 'momentary awareness as quickly and mysteriously as it arrived'. For this reason, the emphasis in CPS programs is placed on developing the habit of recording ideas immediately when they occur instead of trusting them to memory. Although there are times when individuals experience solutions which result from incubation as clear and straightforward, often the information is not obvious and feels more like clues that need to be unraveled (Parnes, 1992a:141). Furthermore, solutions which result from incubation are often typically quite unlike any path which has been tried consciously (Petty, 1997:164). The subconscious seems to think laterally, often taking the conscious by surprise with the unexpectedness of its ideas, as well as by the arbitrariness of the time of their arrival.

Incubation has several advantages: deliberately stopping to work on a problem has the advantage that one may gain distance from ideas so that one is better able to evaluate them at a later phase (Parnes, 1992a:141). Incubation is also a method to 'defer judgment' on a problem. When one consciously defers judgment of ideas during the creative process one increases the time spent on obtaining a variety of perceptions of the problem. Essentially, this is what happens during the process of incubation. Another advantage of incubation is

that it allows an individual's ego to disengage itself from his or her work (Petty, 1997:165-166). It may be particularly helpful to surrender to the subconscious if one is experiencing difficulty within a phase. Petty believes that applying the process of incubation is useful after an Inspiration or Perspiration phase and before an Evaluation phase. It is often more effective to contemplate difficult problems (such as clarification issues) when one is not impatient for progress and willing to incubate on the problem.

The above exposition of the various phases in Petty's model of the creative process indicates that each of the phases has its own distinct purpose, mind-set, advantages and set of cognitive activities. To assist graphic design students to manage the creative process effectively it may be useful to summarize each phase according to its unique purpose, mindset and appropriate mental activities. Such a framework is presented in the next section of the chapter. However, when facilitating the creative process in a classroom situation, supplementing the more 'user-friendly' summarized version below with the descriptive and explanatory content of the previous sections may be necessary.

8.4 SUMMARY OF THE PHASES IN THE CREATIVE PROCESS

8.4.1 Phase 1: Clarification

>Purpose of the Clarification phase:

- To define the parameters of a creative problem.
- To expose and understand all the dimensions of a creative problem.
- To determine the ultimate purpose of a creative problem.

>Activities associated with the Clarification phase:

- Formulate a problem statement with several keywords which addresses the main dimensions of the problem.
- Ensure that all relevant information about the problem is gathered by means of research, interrogation and negotiation.
- Attempt to expose more obscure information which may help to solve a creative problem.
- Probe deeper into the problem by asking 'why' successively.
- Use the Six Universal Questions technique to expose all the potential dimensions of the problem.
- While working, clarify the purpose of each separate element of the prospective solution (such as line, color, tone, composition).
- Ask the set of clarification questions referred to continually while working.
- Clarify personal goals and purposes during and before working on a creative assignment to sustain intrinsic motivation.

>An ideal mind-set for the Clarification phase:

- Logical, rational.
- Strategic.
- Unhurried.
- Inquisitive.

>Advantages of the Clarification phase:

- It ensures that the problem solver stays focused and clear about the requirements of the project.
 - It clarifies a wide range of perspectives on a given situation that could provide a basis for idea generation.
 - It ensures that creative activity is focused towards the right direction and acts as a guide for keeping one's creativity on course.
 - It helps to avoid missing or ignoring important data which may be essential to finding the solution to a problem.
 - It could help to decide among several ideas.
 - It could unblock an individual when stuck.
 - Personal clarification could increase intrinsic motivation.
-

8.4.2 Phase 2: Inspiration

>Purpose of the Inspiration phase:

- To generate an extensive number of ideas and possible starting points for solutions to a creative problem.

>Activities of Inspiration phase:

- Generate ideas by means of a variety of divergent thinking techniques such as:
 - Random Association
 - Morphological Synthesis
 - Metaphors and Analogies
 - Mind-mapping
 - Idea Checklist
 - Sense Connections
 - Visual Thinking.
- Defer judgment during idea generation: avoid saying 'yes' or 'no' to ideas too soon.
- Aim to produce a large quantity of ideas.
- Accept ambiguity, vagueness and incompleteness of ideas – ask 'why not?' instead of 'why'?

>An ideal mind-set for the Inspiration phase:

- Optimistic, positive.
- Fearless, risk-taking.
- Uninhibited, imaginative.
- Lighthearted, playful.

>Advantages of the Inspiration phase:

- It optimizes mind-power to generate several unique ideas (or starting points for ideas).
 - It helps to achieve fluency, flexibility and originality.
 - It helps to unleash the imagination and to shift the limits of idea generation.
 - It helps to gain proficiency and confidence in the implementation of divergent thinking techniques.
-

8.4.3 Phase 3: Distillation

>Purpose of the Distillation phase:

- To select the most appropriate and promising solution to a creative problem among several ideas.

> Activities associated with the Distillation phase:

- Review the findings of the Clarification phase and use as criteria for sifting through ideas.
- Focus on purpose by asking the question 'is that where I want to go?'
- Focus on promise by asking 'where will this idea take me?'
- Evaluate ideas according to their latent embedded creative possibilities; do not judge their undeveloped state.
- Employ a short exploratory session for each idea to determine its creative potential (parallel development), particularly if it is difficult to choose among ideas.
- Choose ideas with the most creative potential, not the ones with the least problems.
- Do not reject good ideas if they present difficulties; attempt to solve difficulties.
- To aid decision making develop a checklist that includes qualities such as simplicity, clarity, honesty, originality, fitness to be used as markers.

>An ideal mind-set for the Distillation phase (dual in character):

- Objective and analytical but also bold and optimistic.
- Strategic and rational but also playful and enthusiastic.
- Realistic but ready to take on challenges.
- Trusts own judgment.

>Advantages of the Distillation phase:

- It ensures that the idea which is selected meets the main purpose of the problem to be solved.
 - Measuring ideas against a criteria checklist verifies the merits of the selected idea.
 - It ensures that the most promising instead of the safest idea is selected.
 - It structures thinking processes to make selection easier.
-

8.4.4 Phase 4: Perspiration

>Purpose of the Perspiration phase

- To work determinedly and persistently on one or more ideas to explore, expand and maximize its/their creative potential before implementation.

>Activities associated with the Perspiration phase

- Experiment with many drafts and redrafts, or produce several alternative 'clean slates' to explore and optimize the creative potential of an idea.
- Determine the reasons why difficulties and mistakes occur and seek strategies or techniques to overcome them.
- Employ short Clarification and Evaluation phases between drafts.
- Experiment with the 'Idea Checklist' technique to trigger a range of alternative creative approaches to an idea.
- Implement a 'parallel development' of more than one promising idea to determine each idea's creative potential.
- Plan to make working sessions comfortable and pleasant in terms of environment, facilities and equipment.

>An ideal mind-set for the Perspiration phase:

- Persistent and perseverant through difficulties.
- Optimistic and enthusiastic.
- Self-confident: does not view mistakes as a lack of talent.
- Playful and enjoying.

>Advantages of the Perspiration phase:

- It provides the opportunity for learning from successes and failures which may occur.
 - Persistence in drafting and redrafting ensures that the creative potential of an idea is maximized.
 - An optimistic mind-set which allows for experimentation and failures pushes the creative potential of an idea to a maximum.
-

8.4.5 Phase 5: Evaluation

>Purpose of the Evaluation phase:

- To examine creative work for strengths and weaknesses.

>Activities associated with the Evaluation phase:

- Firstly, determine and distinguish *what* are the strengths and weaknesses of the work.
- Secondly, determine *why* strengths are considered strong and weaknesses weak.
- Thirdly, determine *how* to capitalize on the strengths and how weaknesses may be eliminated or improved.
- Review the aims and objectives established during the Clarification phase and determine whether the completed work fulfills these objectives.
- Based on one's personal goals and the main objectives of the problem, develop a set of standards which could be used to evaluate the work.
- Analyze smaller elements of the work to determine their purpose and contribution to the main aim of the problem.
- Do not use likes and dislikes as evaluation criteria.
- Learn from failures and successes.

>An ideal mind-set for the Evaluation phase:

- Objective and critical, but optimistic.
- Fearless (e.g. to eliminate weak elements in a work).
- Has a detached ego: pretends as though someone else did the work.
- Trusts own judgment.

>Advantages of the Evaluation phase:

- It provides valuable opportunities for learning and improvement.
 - It provides a 'safety net' which allows the phases of Inspiration and Perspiration to be completely free.
 - It ensures that each element as well as the total work fulfills the aims and purposes of the task.
-

8.4.6 Phase 6: Incubation

>Purpose of the Incubation phase:

- To allow the subconscious to generate potential solutions to a given problem.

>Activities associated with the Incubation phase:

- Allow periods of rest and relaxation between periods of concentrated effort.
- Prepare the mind before an incubation period by reviewing a creative task thoroughly, paying attention to any inconsistencies or unresolved problems.

- Formulate a clear Incubation statement which summarizes the problem, starting for example with 'I need a way to...'
- Formulate Incubation statements to reflect optimistic faith in the attainability of a solution.
- Enter sleep meditatively, quietly 'wondering' about the problem at hand rather than stressing about it.
- Allow a few minutes after waking up to allow the brain to unfold answers that it may have found during the period of sleep.
- Immediately record ideas which result from Incubation – even in the middle of the night: keep a notepad ready.

>An ideal mind-set for the Incubation phase:

- Forget the problem.
- Be relaxed: avoid anxiety about the problem.
- Believe in the attainability of the solution.
- Incubation statements should reflect feelings and tones of hope, optimism and affirmation.

>Advantages of the Incubation phase:

- It allows an individual's ego to disengage itself from his or her work.
- It may help to overcome a difficulty which is experienced at a particular phase.
- It could be used as a method to defer judgment on a problem.
- It provides unobstructed access to the large 'databases' of the subconscious that could provide fertile ground for creative insights.
- During incubation more neurons are freed from their customary duties and can band together, resulting in a large mass of neurons that can deal with problems.
- It enables an individual's mind to make links and associations that may be overlooked when one searches consciously for relationships.

This summary could be utilized to facilitate the effective management of the creative process in graphic design education in various ways. A number of posters containing the purpose, mind-set, activities and advantages of each phase could, for example, be displayed in the classroom. Students could also be provided with a 'mini-manual' of the creative process in the form of a handy booklet in which each page contains the details of each phase. This mini-manual may be particularly helpful to facilitate the process of switching between mind-sets and activities required for each phase.

8.5 Conclusion

The implementation of the various phases of the creative process according to Petty's framework requires a creative person to switch continually between radically different mind-sets. The process requires one to be flexible, as some mind-sets are almost the exact opposite of one another (Petty, 1997:20). During the Inspiration phase, for example, one needs to be uncritical, risk-taking and playful, but the Clarification phase requires a critical, careful and objective mind-set. Using an inappropriate mind-set for a particular phase may be counterproductive. One may, for instance, not be able to generate an extensive number of original ideas during the Inspiration phase when a critical, careful and strategic mind-set is adopted. Likewise, one may not clarify the purpose of a creative task effectively if one is 'slaphappy' and uncritical. It is also important to adopt and apply the right phase at the right time (Petty, 1997:19). No amount of distillation will, for example, help if one needs clarification. Petty (1997:101) believes that many creative blocks are due to the adoption of an inappropriate phase. He advises: 'If stuck, switch phases' (Petty, 1997:19).

An advantage of encouraging students to purposefully employ each phase of the creative process is that it cultivates a 'whole-brain' approach to problem solving. Switching deliberately between various mind-sets and cognitive activities invariably forces an individual to employ various styles of thinking. While some of the phases such as the Inspiration phase requires thinking styles often associated with right-brain thinking, other phases such as the Clarification and Evaluation phase require a more rational, left-brain approach. When both sides of the brain become constructively engaged in a thinking process, it is referred to as 'whole-brain thinking' (Eiffert, 1999:59). Several whole-brain courses have been devised by authors such as Ned Herrmann (1996), Tony Buzan (2002) and Kobus Neethling (1996). These courses teach individuals how to use both segments and all four quadrants of the brain during creative problem solving. It is based on the premise that creative ability may be significantly enhanced if the various thinking styles that are associated with each segment of the brain are consciously employed. Essentially this is what takes place when individuals purposefully employ each phase of the creative process, as proposed in the previous sections.

Thus, it may be said managing the creative process according to the proposed guidelines induce a whole-brain approach to creativity. It achieves to a large extent what authors such as Kobus Neethling and Ned Herrmann aim to do with their whole-brain thinking courses. However, many of their courses utilize questionnaires to determine dominant styles of thinking in individuals. According to this approach, creativity may be enhanced if an individual could identify his/her dominant brain segment with its corresponding thinking style and take deliberate measures to compensate for the weaker part. However, their approach has been

criticized on the basis that measuring brain dominance with questionnaires has not been significantly proved to be accurate (Springer *et al.*, 1997:295). The approach proposed in this chapter, on the other hand, does not as such identify dominant thinking styles in students, but it encourages them to adopt thinking styles that may not be part of their natural problem solving style.

For example, if a student who tends to neglect the preparation and research phase are encouraged to execute a Clarification phase with all the suggested cognitive activities, it could ensure that all the necessary information for the project is gathered and that the creative activity is focused towards the right direction. A student who tends to plan well, but tends to neglect pushing the limits of idea generating far enough, may benefit from applying the principles and divergent thinking techniques of the Inspiration phase. Thus, managing the creative process according to the proposed guidelines ensures that the whole spectrum of cognitive activities required for the successful conception of a creative product is executed. It empowers students with effective strategies to maximize their own creative ability and seem to be an important dimension of a strategic approach to enhance creative ability in graphic design students.

CHAPTER 9

A PROPOSED METHODOLOGY FOR FOSTERING CREATIVITY IN GRAPHIC DESIGN EDUCATION

Introduction

The contribution of this study, namely a proposed Methodology for the fostering of creativity in graphic design education, is presented in this chapter. The chapter commences with a summary of the contents of the preceding chapters to indicate the theoretical basis that was used for the development of the proposed Methodology. The Methodology is presented after the summary and followed by discussions related to the implementation thereof. The chapter concludes with an examination of the aims of the study to indicate whether they were achieved as well as to reflect on the contribution of the study. Finally, recommendations for further research are made.

9.1 Summary of the research program

The chapters that precede the presentation of the proposed Methodology reflect the various perspectives, theories and research studies that lead to the formulation of the Methodology. Chapters 2-8 are divided into two parts: Part 1 focuses on person-related (social-psychological) strategies for the fostering of creativity, while Part 2 comprises of process-and product-related (cognitive) strategies for the stimulation of creativity in graphic design students. The contents and aims of each of these chapters are now briefly discussed.

Chapter 1 introduces the focus of the study and provides a motivation for the undertaking of the study. The main questions that were formulated to guide the study are provided as well as the aims of the study. The central theoretical statement of the thesis is outlined. The method of research is discussed with reference to the types of literature that were consulted for the study. Finally, the chapter provides an explanation of relevant terminology that is used in the thesis.

Chapter 2 introduces the proposed Methodology through a number of discussions that address issues relevant to the formulation of the Methodology. The first discussion formulates an operational definition of creativity that is applicable to graphic design education. It investigates the nature of creativity as a cognitive activity with regard to de Bono's (1993) theories on the mechanisms of the brain. An overview of several factors that

could potentially affect creativity is provided with reference to certain prerequisites for creativity. The discussion indicates that creative ability is a vulnerable activity that may be subject to a wide spectrum of influences. The chapter also addresses whether it is possible to teach creativity and refers to a number of training programs, models and theoretical frameworks documented in literature that were aimed at teaching creativity. The chapter concludes with an introduction to the proposed Methodology with reference to the main prerequisites for creativity that form the basis of the strategies proposed in the Methodology.

Chapter 3 examines the relationship between intrinsic motivation and creativity. The theoretical premise that underlies the chapter is based on Amabile's (1983) *Intrinsic motivation principle of creativity* that holds that when people are primarily motivated to do some creative activity by their own interest in and enjoyment of that activity, they shall be more creative than when they are motivated by external pressures. The beneficial effects of an intrinsic mind-set on creative abilities are outlined. Various research studies that indicate the positive relationship between intrinsic motivation and creativity are referred to. Amabile's (1996) *Componential model of creativity* is discussed with reference to task motivation as a decisive prerequisite for creative ability. The effects of rewards on intrinsic motivation are highlighted. The results of the published research indicate that extrinsic constraints such as grading and evaluation procedures, which are essentially reward-systems, could reduce students' intrinsic motivation and subsequently, their creative ability. Reference is made to several research studies that support or contradict this hypothesis. Strategies to minimize the negative effects of extrinsic constraints on intrinsic motivation and creativity are discussed. The effects of various styles of feedback on intrinsic motivation as well as other extrinsic constraints such as competition or a lack of choice in the educational milieu are outlined. Finally, it is pointed out that the enjoyment of tasks should be emphasized in order to raise students' intrinsic motivation.

Chapter 4 indicates the significance of autonomous, self-regulative behavior for creative ability. It argues that a sense of independence, freedom and individualism are important prerequisites for creativity to flourish. With regard to the educational milieu, it is postulated that controlling events and environments that pressure students to think, feel or behave in particular ways, reduce their sense of individuality and autonomy needed for maximum creative ability. A number of research studies that supports this hypothesis are discussed. The relationship between autonomy and intrinsic motivation is highlighted, indicating that individuals are more likely to self-regulate if they are intrinsically motivated. Three types of strategy information (conceptual, procedural and conditional knowledge) that students need to effectively self-regulate are outlined. The self-regulative processes of self-observation, self-reaction and self-judgment are discussed with regard to their application in graphic

design education. Various educational strategies to facilitate self-regulation in students are discussed. Characteristics of an autonomous, supportive educational environment are described and finally, guidelines for evaluation procedures that support autonomy in graphic design students are provided. Emphasis is placed on self-evaluation as an important aspect of self-regulation.

Chapter 5 illuminates the importance of self-belief as a prerequisite for creative ability. The chapter argues that it is an individual's optimistic belief in his or her creative potential that fuels the creative process with courage, determination, fearlessness and persistence. A simplified explanation of the underlying neurological processes that control human behavior and cognitive ability is provided. The purpose of the discussion is to indicate that a positive belief in one's capabilities results in neurological changes in an individual's brain which support the successful execution of a creative task. Cognitive strategies such as the use of constructive self-talk and visualization to address low levels of self-belief in students are introduced. The discussion is furnished with step-by-step guidelines to implement the strategies. It is explained how a positive self-belief in students leads to a successful psychological cycle that is conducive to creativity. The chapter highlights various dimensions of student-lecturer interaction such as feedback and evaluation procedures that could potentially affect students' belief in their own creative ability. Various educational strategies to enhance students' self-belief during feedback are addressed. The chapter concludes with guidelines to deal with the experience of failure as inhibitor of self-belief in the educational context.

Chapter 6 investigates the negative impact that stress has on creative ability. A distinction is made between positive stress that is conducive to creativity and negative stress that is detrimental to creativity with reference to the conditions under which each type of stress is likely to occur. The notion of 'relaxed attention' is discussed with regard to its significance for creative ability. The neurological mechanisms that take place in the human brain during stressful conditions are explained. The discussion illustrates how creative ability is reduced when students function in a stressful environment. It is postulated that if students understand the manner in which stress affect creativity on a physiological and cognitive level, it may assist them to manage their stress levels to support their creative ability. Certain stressors that could potentially affect students' creative ability in the educational environment such as evaluation procedures, grading and feedback are identified and discussed. It is explained how these stressors may lead to creative blocks in graphic design students. Strategies to assist students to reduce stress in the milieu of graphic design education are outlined. The strategies include the implementation of music, play, humor and relaxation exercises in practical classes.

Chapter 7 introduces a repertoire of divergent thinking techniques to the context of graphic design education that may be used to stimulate and maintain creativity in students. Certain principles that underlie divergent thinking are discussed with reference to their importance for effective idea generation. The following idea generation techniques are described in the chapter: Random Association; Morphological Synthesis; Metaphors and Analogies; Mind-mapping; Idea Checklist; Visual Thinking and Sense Connections. Each technique is described in terms of its methodology, advantages, creative potential and its applicability to graphic design. Examples that demonstrate the technical execution of each technique are provided. A standard graphic design problem statement is devised to be used in these examples. Guidelines for the effective use and implementation of the techniques in the context of graphic design education are outlined. The chapter concludes with an indication of how the techniques could help to foster the social-psychological prerequisites for creativity that are addressed in earlier chapters.

Chapter 8 examines the phases in the creative process with particular focus on the model proposed by Geoffrey Petty (1997). Other models such as the *Osborn-Parnes model for creative problem-solving* are introduced and briefly discussed. The chapter explains how the effective management of the various phases of the creative process in graphic design education could help to enhance students' creativity. The six phases in Petty's model that are analyzed in the chapter are: 'Clarification', which focuses on the aims and objectives of the creative problem to be solved; 'Inspiration', an idea-generating phase; 'Distillation', which entails the selection and distillation of promising ideas; 'Perspiration', a phase which endeavors to maximize the creative potential of ideas; 'Evaluation', which considers strengths and weaknesses in work and 'Incubation', which purposefully employs the sub-conscious to generate ideas. Each of these phases is discussed in terms of its purpose, mind-set, cognitive activities and advantages for the creative process. A summary of the process that may be used to facilitate the teaching and execution of the phases in graphic design education is provided. The chapter is concluded with reference to the notion of whole-brain thinking that results from the purposeful implementation of the cognitive strategies proposed in the chapter.

These chapters provided the theoretical basis for the development of the proposed Methodology, which is introduced and presented in the subsequent sections.

9.2 THE PROPOSED METHODOLOGY

This section presents the contribution of this study, namely a Methodology for the fostering of creativity in graphic design education. The Methodology comprises of two interdependent components, namely:

- (1) **A Learning Program for creativity studies:** The Learning Program aims to provide tuition in the theoretical foundation that students need to enhance their creative ability. It deals with factors that foster and block the flow of creative energy and provides instruction in the cognitive and behavioral strategies that may be employed to manage creative ability. The program consists of a number of study units containing learning material combined with recommended instructional methods appropriate to the teaching of the unit. It is intended to be implemented as part of an undergraduate graphic design curriculum on tertiary level.
- (2) **General Guidelines for fostering creativity:** This component of the Methodology aims to provide educators with a range of general educational strategies and practices which could be employed in conjunction with the Learning Program to support and stimulate creative ability in the broader educational context of graphic design education.

Thus, according to the proposed Methodology, creativity is to be enhanced in graphic design education by means of two main interventions: (1) a structured theoretical program (the Learning Program) that contains study material and instructional methods (to aid the teaching of the units) and (2) certain educational strategies and practices presented as 'General Guidelines' that may be applied (or adhered to) generally throughout the entire graphic design curriculum to foster creativity in students. The General Guidelines refer to practices and strategies that may be used by educators during studio sessions, feedback sessions or during the instruction and facilitation of practical assignments. They do not necessarily apply to the instruction of the learning material of the units, but since they are linked to the theory provided in the Learning Program, there may be some overlapping in terms of educational strategies.

As is the case with the term 'Methodology', the terms 'Learning Program' and 'General Guidelines' are written with capital letters in this chapter to distinguish it from the general use of the words 'learning program' and 'general guidelines'. These two components are presented in the subsequent sections. Each component is preceded by an introduction that explains their respective operational mechanisms in the context of graphic design education.

9.2.1 A PROPOSED LEARNING PROGRAM FOR CREATIVITY STUDIES

Introduction

The proposed Learning Program is presented in the style of Outcome-based Education (OBE), which is the current educational approach followed in South Africa. OBE is a method of curriculum design and teaching that focuses on what students can actually do after they are taught (Acharya, 2003). The term 'learning program' to some extent replaces the term 'syllabus' in OBE. Although a number of definitions for the term 'learning program' have been proposed, the following definition has become popularized:

A learning program consists of courses or units of learning (learning material combined with methodology), by which learners can achieve agreed-upon learning outcomes (Van Wyk, 1999:103).

The proposed Learning Program consists of eight outcome-based study units. Each unit is described in terms of four components: (1) an objective of the unit, (2) an outline of the theoretical contents of the unit, (3) a number of outcomes and (4) recommended instructional methods and tasks that may be used for the teaching of the learning material of each unit.

The first component, the objective of the unit, briefly describes the main purpose of the unit which is to be achieved by the culmination of the set of outcomes. The outcomes listed for each unit should be distinguished from the objective of each unit. The latter refer to the purpose of a unit whereas an outcome refers to a specific ability acquired through the unit. Objectives indicate *why* students should learn the study material and an outcome indicates *what* they need to learn.

The second component of the Learning Program summarizes the theoretical contents of the unit which are regarded to be essential theoretical constructs that would enable students to achieve the outcomes of the unit. The framework is derived from the theories and observations on creativity, which are discussed in the corresponding chapters of the thesis. The theory included as study material with the units is selected on the basis that it is considered as essential knowledge that would help students to purposefully strengthen their creative abilities. Information that leads to the formulation of the proposed Methodology, such as the details of research studies for example, are not regarded as essential for this purpose and are therefore not included in the units. The proposed study material is presented as a summarized framework and is intended to be viewed and elaborated with reference to the theoretical constructs which are discussed in the corresponding chapters. Theory could be made available to students by means of notes, hand-outs, posters or a study guide based on theory contained in the preceding chapters. Other appropriate textbooks which are relevant

to concepts dealt with in each unit may also be used. Indeed, within the OBE approach, a single or specific textbook is not recommended (Acharya, 2003). Since a regular textbook would bring a sense of confinement, OBE prefers to use a varied range of reference books and authentic materials from around the world. However, this approach does not dismiss the value of a textbook based on the proposed theoretical contents which are listed in each unit. Rather, it suggests that such a textbook should not be viewed as the only source of information used for teaching a particular learning program.

The third component of the Learning Program lists a number of outcomes that are to be achieved by teaching and learning the study material of the units. These are presented in a table format since they represent the core of the study unit. It is important to understand the concept of an 'outcome' within OBE guidelines. Spady and Marshall (1994:20-21) wrote 'Outcomes are clear, observable demonstrations of student learning that occur after a significant set of learning experiences'. They are contextually-demonstrated knowledge, skills and attitudes reflecting essential outcomes of a particular learning area (Van Wyk, 1999:101). An outcome can, therefore, be seen as a completed task through which the learner proves that he or she is able to use acquired knowledge and skills to perform a specific task in order to achieve specific outcomes. The content of a well-defined outcome will be clearly defined and be demonstrated through a well-defined process beginning with a directive or request such as 'explain,' 'define' or 'analyze'. Outcome statements cannot be so vague that it is impossible to determine if the learning has occurred (Lorenzon, 2004). The outcomes listed in the proposed Learning Program aim to adhere to these guidelines.

The central premise of OBE is the alignment of outcomes, curriculum and assessment (Furman, 1994:429-430). The OBE design process stipulates that assessments be developed after outcomes are defined and tailored to authentically assess the outcomes. Assessment-criteria are therefore usually written in the format of a reverse sentence of the outcomes. For example, outcomes which follows the introductory sentence of 'After completion of this unit the student should be able to...' are usually duplicated under the heading of 'Is the student able to...?' To avoid unnecessary duplication, the stipulation of assessment-criteria as reversed sentences of outcomes is not included in the proposed Learning Program.

Suggestions for instructional methods appropriate to the teaching of each unit are provided in the fourth category of the unit layout. These methods do not refer to traditional teaching methods such as the use of overhead presentations or structured lecturers to explain theory to students. Instead, they refer to additional methods that may be used, apart from traditional teaching methods, to aid the instruction of the particular content of each unit. They are

additional aids that are intended to help students achieve the outcomes and objective of each unit. The instructional methods should not be confused with the 'General Guidelines' discussed in the second component of the Methodology (section 9.2.3). The instructional methods are particularly aimed to help students learn the theory and achieve the outcomes of each unit where as the General Guidelines are to be applied in the broader context of graphic design education. The instructional methods on the other hand are directly related to the content of each unit and comprise tasks and teaching strategies aimed at the learning of the theory in each unit. Although these methods are considered applicable modes of instruction for the particular units, it is expected that a certain amount of flexibility exists in terms of teaching methodology. OBE guidelines require that the curriculum must be constructed 'design down' with the desired exit outcomes first and all instructional plans built from there (Spady and Marshall, 1994:21). Other appropriate teaching methods may therefore be devised in consideration of the particular outcomes of each unit.

The functions of each component in the unit layout may be summarized as follows:

- **Objective of the unit:** *Why* should students learn the study material?
- **Theory:** *What* study material should students learn?
- **Outcomes:** *What* can students *do* after they are taught?
- **Instructional methods:** *How* could students be helped to learn the study material?

The order in which the study units in the Learning Program are presented needs some clarification. They are not divided according to the two main divisions in the thesis that distinguish between person-related (Part 1) and process-and product-related (Part 2) dimensions of creativity. As cognitive (process-and product-related) and behavioral (person-related) skills are usually interactive and interdependent on each other, it is advisable that the above distinction are not followed in a learning program, but that units are rather be placed in an alternating order. When the acquisition of cognitive and behavioral skills is alternated, it maximizes the interactive potential of the learning material in the units. For example, proficiency in divergent thinking techniques may be useful as a cognitive strategy to enhance creativity, but if these techniques are not supported by appropriate person-related strategies such as the minimization of stress, their effectiveness may be reduced. The eight units are therefore distributed across the Learning Program in a manner which alternates the acquisition of cognitive and behavioral skills in students in the following order:

UNIT 1: What is creativity? (cognitive)

UNIT 2: What influences creativity? (cognitive)

UNIT 3: Intrinsic motivation and creativity (behavioral)

UNIT 4: Creativity tools and techniques (cognitive)

UNIT 5: Self-belief and creativity (cognitive and behavioral)

UNIT 6: The creative process (cognitive)

UNIT 7: Stress and creativity (behavioral)

UNIT 8: Self-regulation and creativity (behavioral)

The objectives of each unit are outlined hereunder:

- **Unit 1** aims to furnish an understanding of what the term 'creativity' means in the context of graphic design education. A definition of creativity is introduced with reference to the various theoretical underpinnings that lead to the formulation of the definition.
- **Unit 2** aims to inform students about the various factors that could potentially affect their creativity within the educational milieu, as well as in a wider social and cultural context. It aims to foster an understanding of the vulnerability of creative ability and establish an awareness of the importance of managing factors that is within an individual's capacity to control. The unit also introduces the main social-psychological and cognitive strategies for the fostering of creativity that are going to be dealt with in the Learning Program.
- **Unit 3** aims to establish an awareness of the relationship between intrinsic motivation and creative ability. It teaches students to purposefully enhance their intrinsic motivation to maximize their creative abilities and to minimize the negative effects of extrinsic constraints in the educational milieu.
- **Unit 4** familiarizes students with a repertoire of divergent thinking techniques that may be used to stimulate idea generation in graphic design. The unit aims to empower students with effective self-help strategies that may be used to overcome creative blocks and maximize creative ability. The techniques learnt in this unit also strengthen students' innate creative abilities since they provide exercise in certain thinking processes that underlie creativity. The instructional methods that are proposed in this unit ensure that students reach a high level of proficiency in the use of the techniques. The unit is more extensive than the other units in the Learning Program and may require several sessions before the students are proficient in the execution of the techniques.
- **Unit 5** familiarizes students with effective cognitive and behavioral strategies to enhance their belief in their own creative abilities. It teaches students to identify habitual thought patterns that limit their creative abilities and replace them with constructive verbal or visualized statements that are conducive to creativity.
- **Unit 6** aims to raise students' creative abilities by teaching them how to control the various phases of the creative process effectively by means of thinking strategies and

mind-sets that are appropriate for each phase. Managing the creative process according to the guidelines provided in this unit ensures that the whole spectrum of cognitive activities required for the successful production of a creative product is executed.

- **Unit 7** informs students how their creative abilities may be reduced under stressful conditions. The unit familiarizes students with several coping strategies for dealing with stress in the educational milieu. The neurological mechanisms that take place in the human brain during stressful conditions are outlined. It is regarded as essential that students understand these brain-based conditions in order for them to be able to identify and manage the symptoms that are associated with them.
- **Unit 8** aims to establish an understanding of the importance of self-regulation, autonomy and individualism for creative ability. It provides an overview of the strategies that were dealt with in the preceding units and focus on the self-regulative use of these strategies to maximize student's creative abilities.

Each of these units is now presented in the following section.

UNITS 1-8 OF THE PROPOSED LEARNING PROGRAM

The units in the proposed Learning Program are presented according to the four components referred to in the previous section, namely an (1) objective of the unit, (2) the theoretical contents of the unit, (3) the outcomes of the unit and (4) instructional methods appropriate for the teaching of the unit.

UNIT 1 WHAT IS CREATIVITY?

OBJECTIVE OF UNIT 1:

Unit 1 discusses various perspectives on the nature of creative activity which is relevant to the definition of creativity. It aims to furnish an understanding of what the term 'creativity' means in the context of graphic design education. The unit introduces certain key concepts of creative ability which are dealt with later in the Learning Program.

THEORETICAL FRAMEWORK OF UNIT 1:

- The unit is introduced with recognition of the complexities involved in defining a phenomenon such as creativity. It is pointed out that no universally accepted definition of creativity exists.

- An operational definition formulated particularly for the purposes of graphic design is introduced. The four main theoretical constructs which are contained in this definition are explained and motivated.
- The myth of creativity as being the result of instantaneous inspiration (a 'light bulb in the mind') is questioned against the notion that creativity requires hard work and effort to be realized. Reference is made to creative geniuses of the past such as Van Gogh and Edison's approaches to the creative process.
- The myth that creativity originates mainly in the right side of the brain and excludes logical and rational thinking is discussed with reference to de Bono's (1993) research with PET scans of the brain.
- De Bono's theories (1993) on the mechanisms of the human brain are explained. The discussion indicates how creative ideas are formed in the brain. Diagrams that illustrate the pattern-forming behavior of the human brain are included. The significance of de Bono's work for the formulation of a definition of creativity is explained with reference to creative ideas as simultaneously being novel and logical.
- The two qualities of functionality and originality as the hallmarks of creative ideas are discussed with reference to Guilford's (1992) definition of creative thinking. Guilford's theories of convergent and divergent thinking are explained.
- The importance of 'newness and relevance' in the creative advertising industry is pointed out and linked to the definition of creativity provided in the introduction of the unit.
- The importance of an ability to produce a large number of ideas during the creative problem solving process is discussed with regard to the formulation of a definition of creativity.
- The question as to which party's satisfaction the creative product should comply is addressed with reference of its implications for defining creativity.

OUTCOMES OF UNIT 1:

After completion of this unit, the student should be able to:

<ul style="list-style-type: none"> • Define creativity with regard to graphic design education.
<ul style="list-style-type: none"> • Discuss two myths about creativity which is relevant to the definition of creativity.
<ul style="list-style-type: none"> • Explain how creative ideas originate in the human brain.
<ul style="list-style-type: none"> • Draw a diagram to illustrate the pattern-forming behavior of the human brain.
<ul style="list-style-type: none"> • Explain the diagram with regard to the notion of creative ideas being novel and logic simultaneously.

- | |
|---|
| <ul style="list-style-type: none"> • Discuss Guilford's theories of convergent and divergent thinking with regard to originality and functionality of the creative product and its implications for defining creativity. |
| <ul style="list-style-type: none"> • Discuss the concepts of 'newness and relevance' with regard to creative ideas in the advertising industry. |
| <ul style="list-style-type: none"> • Comment on the question as to whose satisfaction the creative product should comply. |

INSTRUCTIONAL METHODS RECOMMENDED FOR THE TEACHING OF UNIT 1:

- Initiate informal classroom discussions on topics such as:
 - ~ Is creativity synonymous with the proverbial 'light-bulb in the mind'?
 - ~ To whose satisfaction should the creative product comply?

<p>UNIT 2</p> <p>WHAT INFLUENCES CREATIVITY?</p>
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OBJECTIVE OF UNIT 2:

This unit aims to inform students about the various factors that could potentially affect their creativity within the educational milieu, as well as in a wider social and cultural context. It aims to foster an understanding for the vulnerability of creative ability and establish an awareness of the importance to manage factors that is within an individual's capacity to control. The unit also introduces the main strategies for the fostering of creativity that will be dealt with in the following units of the Learning Program.

THEORETICAL FRAMEWORK OF UNIT 2:

- The unit is introduced by a discussion on the various factors that could influence creativity. Van Demark's (1991) table that lists the potential interacting factors that could affect the creative capabilities of an individual is provided.
- Reference is made to a number of traits and requirements that is postulated to be prerequisites for creative ability.
- The impact that cultural pressures and restrictive educational environments have on creative ability is explained.
- The three main factors that are considered to be the most prominent prerequisites for creative productivity (domain-relevant skills, creativity-relevant skills and task motivation) are discussed with reference to Amabile's (1996) *Componential model of creativity*. It is pointed out that strengthening each of the three components is postulated to enhance students' creativity. The discussion points out that creative

ability does not arise from cognitive skills only, but from a constellation of psychological, affective, motivational and personal properties.

- The main person-, process- and product-related strategies that are dealt with in the remaining units of the Learning Program are introduced with reference to their significance for the fostering of creative abilities.
- The unit is concluded with a discussion of characteristics that are typical of creative people.

OUTCOMES OF UNIT 2:

After completion of this unit, the student should be able to:

• List a number of factors that could influence a person's creative abilities.
• Discuss the impact that cultural pressures and restrictive educational environments have on creative ability.
• Describe the three main factors in Amabile's <i>Componential model of creativity</i> that are regarded to be essential prerequisites for creative productivity.
• State six person-, process- and product-related strategies that are effective for the fostering of creative abilities.
• Name a few characteristics that are typical of creative people.

INSTRUCTIONAL METHODS RECOMMENDED FOR THE TEACHING OF UNIT 2:

- Initiate informal classroom discussions on topics such as:
 - What influences your creative abilities?
 - What do you think are typical characteristics of creative people?

UNIT 3

INTRINSIC MOTIVATION AND CREATIVITY

OBJECTIVE OF UNIT 3:

This unit aims to cultivate an awareness of the relationship between intrinsic motivation and creative ability. It teaches students to purposefully focus on intrinsic motivation to enhance their creativity. The unit aims to raise student's abilities to cognitively minimize extrinsic constraints and to identify motivational orientations which are not conducive to creative ability.

THEORETICAL FRAMEWORK OF UNIT 3:

- The unit defines intrinsic motivation and explains the difference between intrinsic and extrinsic motivation.

- Amabile's (1992) *Intrinsic motivation principle* is discussed.
- The reasons why intrinsic motivation is conducive to creativity is explained.
- Reference is made to the three main prerequisites for creativity (domain knowledge, creativity skills and task motivation) in Amabile's *Componential model of creativity* that was introduced in Unit 2. The discussion focuses on task motivation as the most important determinant of the difference between what a person *can do* and what a person *will do*.
- The effects of rewards on creativity and intrinsic motivation are explained, with particular emphasis on the impact of grades and evaluation on intrinsic motivation. The discussion cautions students against the potential damaging effects of grading on creativity and encourage them to 'immunize' themselves against it.
- Guidelines on how to shield one from the negative influences of extrinsic constraints are provided. The discussion encourages students to focus on their own reasons for being creative based on their personal needs, values, belief systems and goals.
- The phenomenon of 'flow' is explained with reference to intrinsic motivation and creativity. The discussion highlights the relationship between skills, challenge and flow.

OUTCOMES OF UNIT 3:

After completion of this unit, the student should be able to:

• Differentiate between intrinsic and extrinsic motivation.
• Explain Amabile's <i>Intrinsic motivation principle</i> .
• Describe why intrinsic motivation is conducive to creativity.
• Explain the importance of task motivation in Amabile's <i>Componential model of creativity</i> .
• Discuss the potential damaging effects of evaluation procedures on intrinsic motivation.
• Discuss the phenomenon of 'flow' with reference to intrinsic motivation and creativity.

INSTRUCTIONAL METHODS RECOMMENDED FOR THE TEACHING OF UNIT 3:

- Initiate a classroom conversation where students discuss their own motivations for engaging in creative work. Relate the discussion to the principles of intrinsic motivation and creativity as presented in the theoretical component of the unit.
- Enable students to complete Amabile's *Intrinsic/extrinsic motivation test* (Annexure E) to identify intrinsic or extrinsic motivation in students.

- Teach students to take the focus off external goals and constraints and to concentrate on intrinsic motives by asking them to list a number of intrinsic reasons for engaging in creative work or for choosing graphic design as a career. Encourage them to make small posters of the list and display it in their personal working space.

UNIT 4

CREATIVITY TOOLS AND TECHNIQUES

OBJECTIVE OF UNIT 4:

This unit familiarizes students with a repertoire of divergent thinking techniques that may be used to stimulate idea generation in graphic design. The unit aims to empower students with self-help strategies that may be used to overcome creative blocks and maximize creative ability. The techniques learnt in this unit strengthen students' innate creative abilities since they provide exercises in certain thinking processes that underlie creativity.

THEORETICAL FRAMEWORK OF UNIT 4:

- The processes of divergent and convergent thinking are described with reference to their respective applications in the creative process.
- The two principles of effective idea generation, namely the deliberate deferment of judgment and quantity breeds quality, are discussed. The rationale for the use of these two principles during creative thinking is explained.
- A brief overview of the techniques that are going to be taught in the unit is provided with reference to their application in graphic design. Students are cautioned that they may at first experience resistance to work with the techniques as a means for creative idea generation since they may be used to more spontaneous approaches to creative problem solving. It is explained that once they feel proficient in using the techniques, they will realize that is often more effective and less time consuming than unstructured, intuitive methods.
- The significance of the formulation of a problem statement for creative idea generation is pointed out. An example of a typical problem statement that relates to a graphic design brief is provided.
- The methodology and purpose of the 'Random Association' technique is explained. Various methods of finding random inputs for the execution of the technique are provided. Examples of how the technique has been used to generate creative ideas in graphic design are provided.
- The mechanisms in the human brain that underlie the Random Association technique is explained with reference to de Bono's (1993) theory of the brain as a self-organizing system.

- The methodology and purpose of the Morphological Synthesis technique is explained and an example of the technique's application to a typical graphic design problem is provided. Examples of creative ideas that could be generated by the technique are given. The example explains the associative thinking processes that are required for the execution of the technique.
- It is explained by means of an example, how the Morphological Synthesis technique may be used to generate ideas for product design and packaging.
- The technique of using metaphorical and analogical thinking for idea generation in graphic design is introduced. Examples that illustrate the technique's effectiveness for creative conceptualization in the advertising industry are provided. The reasons why the use of metaphors is effective for the advertising industry are discussed.
- A number of metaphor types that could be used in the advertising industry, such as 'feature' metaphors, 'benefit' metaphors and 'reverse' metaphors are discussed. Examples of each type are included in the discussion.
- The methodology and potential of Mind-mapping as a technique for idea generation is explained. The advantages of non-linear thinking for idea generation are outlined with reference to the brain's ability to sort and select information. The advantages that mind-maps have over linear forms of information processing are stipulated. An example of a mind-map that relates to a graphic design problem is provided. The example illustrates how ideas which flow associatively from words expand a core concept into multiple related concepts which could be explored for creative solutions.
- Various types of mind-maps that could be used to produce different sets of information for idea generation are described such as a 'sensory mind-map' or a 'six universal questions' mind-map.
- The Idea Checklist technique is introduced as a method to explore all possible modifications of an existing concept or arrive at new solutions by means of a structured transformation process. Each of the 'triggers' in the Idea Checklist technique are explained with regard to its potential application in graphic design. A summary of the triggers are provided at the end of the discussion. The summary could be used by students to experiment with the technique. A visual example that illustrates the technique's potential to transform creative ideas is included.
- The technique of Visual Thinking is introduced as a strategy to evoke visual solutions for graphic design problems. Reference is made to the power of visual images to communicate information in more accurate or abstract ways than words. Various approaches to the technical execution of the technique are explained and enhanced with visual examples.
- The technique of Sense Connections is introduced. A systemized method to implement the technique is explained with regard to product advertising. Various

approaches to the technique are explained such as the use of 'Reversed Sense Connections' or the conceptualization of a 'five senses mind-map'.

- Guidelines for the effective use and implementation of the techniques in the context of graphic design education are outlined.

OUTCOMES OF UNIT 4:

After completion of this unit, the student should be able to:

<ul style="list-style-type: none"> • Describe the processes of divergent and convergent thinking with regard to their respective functions for creative problem solving.
<ul style="list-style-type: none"> • Discuss the two principles of effective idea generation with reference to their significance for the idea generation process.
<ul style="list-style-type: none"> • Explain the purpose of a creative problem statement for idea generation.
<ul style="list-style-type: none"> • Formulate a concise problem statement that captures the main key-words of a creative problem.
<ul style="list-style-type: none"> • Explain the methodology of the Random Association technique with reference to de Bono's theory of the brain as a self-organizing system.
<ul style="list-style-type: none"> • Apply the Random Association technique to generate a large number of original ideas for a specified graphic design problem.
<ul style="list-style-type: none"> • List various methods of finding random inputs for the execution of the Random Association technique.
<ul style="list-style-type: none"> • Explain the methodology of the Morphological Synthesis technique and apply the technique to generate a large number of original ideas for a specified graphic design problem.
<ul style="list-style-type: none"> • Indicate how the Morphological Synthesis technique may be used to generate ideas for product design and packaging.
<ul style="list-style-type: none"> • Employ metaphorical or analogical thinking to generate a large number of original ideas for a graphic design brief related to the advertising industry.
<ul style="list-style-type: none"> • Explain the reasons why the use of metaphors use of metaphors is effective for the advertising industry.
<ul style="list-style-type: none"> • Name a number of metaphor types that could be used in the advertising industry and provide examples of each type.
<ul style="list-style-type: none"> • Explain why non-linear thinking, as utilized in a mind-map, is effective to expand a concept for idea generation.
<ul style="list-style-type: none"> • List the advantages that mind-maps have over linear forms of information processing.

<ul style="list-style-type: none"> • Draw a mind-map that illustrates how a core concept of a graphic design problem could be expanded into multiple related concepts which could be explored for creative solutions.
<ul style="list-style-type: none"> • Generate a large number of original ideas from the mind-map that may be used to conceptualize an original creative solution to a graphic design problem.
<ul style="list-style-type: none"> • Describe various types of mind-maps that could be used to produce different sets of information for idea generation.
<ul style="list-style-type: none"> • Utilize the Idea Checklist technique to explore all possible creative modifications of an existing design and arrive at new solutions for the creative problem.
<ul style="list-style-type: none"> • Explain various approaches to the methodology of Visual Thinking.
<ul style="list-style-type: none"> • Employ various approaches to the Visual Thinking technique to arrive at a variety of original imagery that could be used for a graphic design problem.
<ul style="list-style-type: none"> • Explain the methodology of the Sense Connections technique.
<ul style="list-style-type: none"> • Employ the Sense Connections technique to generate a number of creative solutions for a specified graphic design problem.
<ul style="list-style-type: none"> • Describe the ideal mind-set for implementation of techniques.
<ul style="list-style-type: none"> • Select and apply an appropriate divergent thinking technique from a range of techniques to generate a large number of creative ideas for a specified graphic design problem.

INSTRUCTIONAL METHODS RECOMMENDED FOR THE TEACHING OF UNIT 4:

- Use typical graphic design problems to demonstrate the methodologies of each technique. Show visual and conceptual examples of how the techniques have been used to generate ideas in graphic design.
- Ensure that students become proficient in the use of the techniques by providing sufficient opportunities to play and experiment with them in the classroom. When students are instructed to employ a stipulated technique in a classroom setting, the class could participate as one group or be divided into smaller groups. Provide hand-outs that could facilitate experimentation with the techniques. For example, hand-outs could include the list of words presented in Annexure J to assist the execution of the Random Association technique or the summary of the triggers in the Annexure P to assist with the Idea Checklist technique.
- When students experiment with techniques that require the creative problem to be divided into a number of main categories, the class may be divided into groups where each group represents one main category. Examples of such techniques are the Morphological Synthesis technique, Mind-mapping, the Six Universal Questions and

the Sense Connections technique. Each group could then brainstorm a number of associations for their particular category. The synthesis of all the ideas generated by the groups is then transferred to the main structure of the technique such as a matrix (for Morphological Synthesis), a mind-map or a grid (for the Six Universal Questions technique and the Sense Connections technique).

- Encourage students to find other techniques on the internet and in prescribed sources that may be used for application in graphic design.
- Apart from classroom exercises, give students assignments that require them to demonstrate their skills in utilizing the techniques for specified creative problems. In the beginning of the unit, certain techniques could be specified for particular problem statements and later, as the students become more skilled in the use of the techniques, they could be assigned to select one or more appropriate techniques to generate ideas for a specified graphic design problem.
- Allow opportunities to practice metaphorical thinking in the classroom. Students should first start with simple comparisons between similar objects, later progressing to more abstract processes that explore metaphors for concepts such as 'happiness', 'freedom' or 'space'. Students could practice metaphorical thinking by forcing similarities between remote objects. For example, they might examine how a rock is like a tree or how a feather is like a book.
- Allow opportunities to practice the Visual Thinking technique in the classroom by doing 'visual brainstorming'. This exercise requires that an educator read words at random (or words generated by means of a mind-map or a matrix) while students draw quick sketches representing the words. Students could also be asked to develop a 'visual matrix' or a 'visual mind-map' at home that allow for more accurate drawings based on observation and reference material. As an alternative, images could be drawn on separate index cards and then grouped, regrouped and juxtaposed randomly into various relationships to provoke ideas. They could also be drawn on a transparent surface and superimposed on each other to trigger surprising pictorial solutions.
- Remind students to adhere to the two principles of brainstorming during idea generation, namely to defer judgment while generating ideas and to aim for large quantities of ideas. Being critical of concepts as they arise may inhibit responses which could turn out to have creative potential. A minimum requirement for the quantity of ideas that needs to be generated may be stipulated to push students past the 'safer' ideas that tend to occur first during idea generation.
- When students experiment with the techniques in the classroom teach them to adopt a relaxed, playful mind-set. Teach them that the techniques could be freely combined and adapted according to need: if one technique does not produce results they

should not dwell on it but simply move on to another. Strategies such as the use of music or humor may be introduced to establish a relaxed, light-hearted atmosphere during idea generation.

- Although a playful attitude is conducive to creative ability, it is important to emphasize the precise use of the techniques. The techniques work most efficiently when used correctly in accordance with their described methodologies. Precise use implies being skilful in the application of the techniques as well as knowing the steps and creative potential of each technique. It is also important to encourage students to persevere in the full execution of each technique.

UNIT 5 SELF-BELIEF AND CREATIVITY
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OBJECTIVE OF UNIT 5:

Unit 5 focuses on the relationship between creative ability and self-belief. It empowers students with self-help strategies that may be used to identify habitual thought patterns that limit their creative abilities and replace them with constructive verbal or visualized statements that are conducive to creativity.

THEORETICAL FRAMEWORK OF UNIT 5:

- The importance of self-belief as an essential prerequisite for creativity is explained.
- A simplified explanation of the underlying neurological processes that control cognitive ability is provided. It is explained that a positive belief in one's capabilities results in neurological changes in an individual's brain which support the successful execution of a creative task. Students are advised to take conscious control of these processes in order to sustain their creative abilities.
- A simplified illustration of the bio-chemical processes in the brain that indicates how positive or negative beliefs 'program' the brain to fulfill a verbal message is included. The impact of personal belief-systems on cognitive abilities such as creativity is explained with reference to the illustration.
- It is explained how recurrent thoughts of inability that are processed by the left brain may lead to patterns of perceptions in the right brain that eventually manifests in habitual behavior. The discussion indicates that the pattern-forming behavior of the brain could lead to negative conditioning that may result in a creative block. Examples of how this might happen in the context of graphic design education are provided.
- Cognitive strategies such as the use of constructive self-talk and visualization to address low levels of self-belief are introduced. The discussion is furnished with step-by-step guidelines to implement the strategies.

- A diagram that illustrates how a positive self-belief leads to a successful psychological cycle that is conducive to creativity is included. It is explained how the experience of failure or success could strengthen a positive or a negative psychological cycle.
- Students are informed about three ways in which reasons for failure may be interpreted, namely, locus, stability and controllability. The discussion explains that perceptions, whether it is related to anyone of these three factors, may not necessarily be objective truths, but may be false perceptions that resulted from a number of negative experiences.
- Effective strategies to deal with failures that occur in the educational context of graphic design are provided. The strategies are intended to support creative ability.
- The importance of separating one's ego from creative work is also pointed out.

OUTCOMES OF UNIT 5:

After completion of this unit, the student should be able to:

<ul style="list-style-type: none"> • Explain the neurological processes that control creative ability in an individual with reference to constructive and destructive self-talk.
<ul style="list-style-type: none"> • Draw a simplified illustration of the bio-chemical processes in the brain that indicates how positive or negative beliefs 'program' the brain to fulfill a verbal message.
<ul style="list-style-type: none"> • Describe how perceptions develop in the human brain and its potential impact on creative ability.
<ul style="list-style-type: none"> • Explain how recurrent thoughts of inability may lead to a creative block.
<ul style="list-style-type: none"> • State and briefly discuss nine guidelines for the deliberate cultivation of constructive thinking patterns in the brain that are conducive to creativity.
<ul style="list-style-type: none"> • Explain the psychological cycles that tend to be induced by the experience of failure or success during creative activity.
<ul style="list-style-type: none"> • Mention three ways in which reasons for failure may be interpreted.
<ul style="list-style-type: none"> • Explain what is meant by 'responsive' and 'defeatist' attitudes to failure and how these attitudes may impact on creative ability.
<ul style="list-style-type: none"> • Discuss why it is important to separate one's ego from creative work.

INSTRUCTIONAL METHODS RECOMMENDED FOR THE TEACHING OF UNIT 5:

- Demonstrate how the power of constructive thoughts and visualization could be used to overcome perceived limitations, by doing the following exercise in the classroom:

Instruct students to lift their right arms and point their forefingers in front of them. Then, instruct them to swing their arms backwards as far as they

possibly can. The place where their pointing fingers stop is 'marked' with their eyes. Going back to the initial position, they are now instructed to close their eyes and visualize how their arms swings back and move *beyond* the initial point that was 'marked', at least a quarter of a circle further. After the visualization, repeat the first instruction to swing their arms backwards as far as possible. In most instances, the students' arms will move significantly further than the first time. The demonstration indicates how possibility thinking could be used to overcome perceived limitations in graphic design education.

UNIT 6 THE CREATIVE PROCESS
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OBJECTIVE OF UNIT 6:

This unit aims to raise students' creative abilities by teaching them how to control the various phases of the creative process effectively by means of thinking strategies and mind-sets appropriate for each phase. Managing the creative process according to the guidelines provided in this unit ensures that the whole spectrum of cognitive activities required for the successful production of a creative product is executed.

THEORETICAL FRAMEWORK OF UNIT 6:

- The unit commences with a rationale for incorporating this unit into a Learning Program for creativity studies. It explains that students' creative abilities may be improved if they understand the cognitive nature of each phase in the creative process and employ effective thinking strategies to execute them.
- A brief overview of the six phases of the creative process is provided. It is pointed out that the phases of the creative process are not intended to follow one another chronologically as a linear sequence of events, but are in fact interwoven and may be encountered many times during the creative process.
- The two main aims of the Clarification-process are discussed, namely to define the purpose of a creative problem and to gather information about the problem that may be used for idea generation.
- Examples of thinking strategies that may be used to gather relevant information during the Clarification-phase are provided. The examples are applied to a typical graphic design problem. The advantages of using these thinking strategies are outlined.
- A range of questions which could be used on a continual basis during the Clarification-phase to determine whether the work is still in line with the main aim of the assignment is provided.

- It is explained how the Clarification-process could be applied to sub-elements of a design such as line, color, tone and composition.
- The ideal mind-set to adopt during the Clarification phase is outlined.
- The importance of 'personal clarification' during and before working on a creative assignment is pointed out with reference to certain questions that may be asked to determine individual goals and motivational orientations.
- The main aims of the Inspiration-phase are pointed out. A brief overview of the divergent thinking techniques as the main cognitive 'tools' that are to be used for the execution of the phase is provided. Reference is made to the examples that were given in Unit 4. The importance to master the techniques through regular use is emphasized.
- The ideal mind-set and cognitive approach to adopt during the implementation of the thinking strategies in the Inspiration phase are outlined. Reference is made to the relationship between these mind-sets and intrinsic motivation, as addressed in Unit 3.
- Osborn's two principles of brainstorming as formulated in Unit 4 are reviewed with regard to their significance for the successful execution of the Inspiration-phase. It is emphasized that ideas generated during this phase should be viewed as starting points for creative solutions and will be shaped and refined later in the creative process.
- The purpose of the Distillation phase is explained. Students are cautioned against selecting ideas on the basis that they seem 'safer', risking the rejection of original ideas which may seem problematic but dispose of more creative potential.
- Two vital guidelines for decision making during the Distillation phase are discussed. The value of implementing a short exploratory session for each idea or a short clarification stage when needed is pointed out.
- The dual mind-set that needs to be adopted for the Distillation phase is explained.
- Reference is made to the generation of a criteria checklist to aid decision making during the Distillation phase.
- The purpose of the Perspiration-phase is outlined with reference to the perception of creativity as being the result of spontaneous and sudden insight as discussed in Unit 1. The notion that creative achievement requires sustained effort and a large investment of time and energy to be realized is emphasized.
- The main tools to be applied during the Perspiration-phase, namely drafts, redrafts or 'clean slates' are discussed. Students are informed that the aim of a draft is not to produce work which is relatively free of mistakes or inconsistencies, but should rather be viewed as an experimental exploration to discover an idea's richness and full potential. The merits of using the Idea Checklist technique (discussed in Unit 4)

during drafting to ensure a variety of creative approaches to a concept are pointed out.

- The importance of a persevering mind-set when difficulties are experienced during the Perspiration-phase is emphasized. Reference is made to the persevering mind-sets of creative geniuses of the past, such as Matisse and Edison. The significance of other appropriate mind-sets related to intrinsic motivation (Unit 3) and responsiveness (Unit 5) for the Perspiration-phase is outlined. Students are cautioned not to be too critical of drafts during the Perspiration-phase. Judgment should be deferred until ideas have had a chance to develop to their full potential.
- The importance of working in a comfortable and pleasant environment that is conducive to creativity during the Perspiration-phase is pointed out.
- The Evaluation-phase is introduced with reference to the importance of self-evaluation for creative ability.
- The three-step technique that utilizes the questions of 'what, 'why' and 'how' to evaluate creative work is explained.
- The ideal mind-set for implementing the Evaluation phase is discussed. Students are cautioned to detach their egos from their work during evaluation and not to question their talents or skills on the basis of unsuccessful work.
- The differences in the mind-sets of the Perspiration-phase and the Evaluation-phase are outlined in a table.
- The purpose of the Incubation phase is explained with reference to the neurological mechanisms of the subconscious mind. The importance of allowing times for rest and relaxation in between periods of creative activity is stressed.
- Guidelines for maximizing the chances for ideas to appear during incubation are described. The ideal mind-set to adopt during incubation is described. The importance of recording ideas immediately when they occur during or after incubation is pointed out. The advantages of incubation are outlined.
- A summary of the six phases in the creative process is provided. The summary outlines the purpose, mind-set, advantages and set of cognitive activities of each phase.

OUTCOMES OF UNIT 6:

After completion of this unit, the student should be able to:

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| <ul style="list-style-type: none">• List the six phases of the creative process with brief reference to the purpose of each phase. |
| <ul style="list-style-type: none">• Mention the two main aims of the Clarification-process. |

<ul style="list-style-type: none"> • Explain two thinking strategies that may be used to gather relevant information during the Clarification-phase.
<ul style="list-style-type: none"> • List a range of questions which could be used on a continual basis during the Clarification-phase to determine whether the work is still in line with the main aim of the assignment.
<ul style="list-style-type: none"> • Explain how the Clarification-process could be applied to sub-elements of a design such as line, color, tone and composition.
<ul style="list-style-type: none"> • Describe the ideal mind-set to adopt during the Clarification-phase.
<ul style="list-style-type: none"> • Explain the significance of 'personal clarification' for creative ability.
<ul style="list-style-type: none"> • Name seven divergent thinking techniques that could be used for idea generation during the Inspiration-phase.
<ul style="list-style-type: none"> • Describe the ideal mind-set to adopt during the Inspiration-phase.
<ul style="list-style-type: none"> • Discuss two vital guidelines for decision making during the Distillation-phase.
<ul style="list-style-type: none"> • Explain what is meant by a 'dual mind-set' that needs to be adopted for the Distillation-phase.
<ul style="list-style-type: none"> • Mention the purpose of the Perspiration-phase.
<ul style="list-style-type: none"> • Discuss the myth of creativity as being the result of a 'light-bulb in the mind'.
<ul style="list-style-type: none"> • Explain the purpose of drafting during the Perspiration-phase with reference to appropriate ways to approach difficulties that occur during this phase.
<ul style="list-style-type: none"> • Describe a technique that may be used during the Perspiration-phase to ensure a variety of creative approaches to a concept.
<ul style="list-style-type: none"> • Explain the value of a persevering mind-set for the Perspiration-phase with reference to the working methods of creative geniuses of the past.
<ul style="list-style-type: none"> • Describe an effective three-step technique that could be used to evaluate creative work and apply the technique to an artwork.
<ul style="list-style-type: none"> • Explain why it is important to detach one's ego from an artwork during the evaluation process.
<ul style="list-style-type: none"> • Explain how to maximize the chances for ideas to appear during the Incubation phase.

INSTRUCTIONAL METHODS RECOMMENDED FOR THE TEACHING OF UNIT 6:

- Initiate an informal classroom discussion in the beginning of the unit asking students to comment on the ways with which they normally approach the creative process. Give attention to each phase of the creative process.

- Display a number of posters that summarize the purpose, mind-set, activities and advantages of each phase in the classroom during the teaching of the unit.
- During instruction of the Clarification-phase provide students with an opportunity to write a 'personal manifesto' that addresses questions such as
 - ~ Why did I choose graphic design as a career?
 - ~ What gives **me** most enjoyment in my work?
- During instruction of the Distillation phase, ask students to develop their own criteria checklist for selecting ideas. These may then be presented to the class for discussion. Some of the checklists may be used to guide the selection of the best idea amongst a number of ideas that were generated during the Inspiration-phase.
- During instruction of the Evaluation phase, explain the three-step technique that utilizes the questions of 'what, 'why' and 'how' to evaluate creative work by applying the technique to visual examples of student artwork. Provide opportunities for students to execute the technique by themselves in the classroom. Students could also be divided into 3 groups that represent the three questions of 'what, 'why' and 'how'. Each group could then evaluate the artwork in terms of their assigned question.
- Supply students with a 'mini-manual' containing a summary of the phases in the creative process.
- Provide opportunities for feedback on how students experience the implementation of the various phases of the creative process during the execution of their practical projects in other modules of the curriculum.

UNIT 7

STRESS AND CREATIVITY

OBJECTIVE OF UNIT 7:

This unit explains to students how their creative abilities may be reduced under stressful conditions. The unit familiarizes students with several coping strategies for dealing with stress in the educational milieu. The neurological mechanisms that take place in the human brain during stressful conditions are outlined to enable students to identify and manage the symptoms that are associated with these mechanisms.

THEORETICAL FRAMEWORK OF UNIT 7:

- The difference between positive stress that is conducive to creativity and negative stress that is detrimental to creativity is explained. The conditions needed for each type of stress to occur are outlined.

- The notion of 'relaxed attention' is discussed with regard to its significance for creative ability. The ideal conditions for creativity to flourish are outlined with reference to the phenomenon of 'flow'.
- The negative impact that stress has on creative ability is explained with reference to the changes that take place in the neurological mechanisms of the human brain during stressful conditions. Reference is made to the 'flight-and-fight' response of the brain and it is explained how this reaction could lead to creative blocks or a reduction in creative ability.
- It is explained why 'alpha' waves, which is generated during relaxation, is conducive to creative ability.
- Students are cautioned that the pressure of evaluation and grading may reduce their creative abilities. It is explained that these procedures may cause students to avoid taking creative risks and focus only on what is required to make the grade, thereby reducing their ability to explore more challenging paths to a creative solution.
- It is explained why fear of failure is regarded as a debilitating stress-related block to creativity. The discussion encourages students to manage their stress levels by accepting the possibility of failure and viewing mistakes as an opportunity for learning. Reference is made to related issues that were discussed in Unit 5 on self-belief and creativity.
- A range of relaxation techniques aimed at reducing the types of cognitive and muscular stress that are associated with creative activities are outlined (Annexure I). Their potential applications in the context of graphic design education are pointed out.
- The impact of negative thought patterns on stress levels is pointed out with reference to related issues that were dealt with in Unit 5. The discussion points out how an 'automatic anxiety reaction' could result from habitual thinking patterns that question creative ability.
- It is explained how music enhances creative ability in the human brain. Reference is made to types of music that are the most conducive to creative ability.
- It is explained why adopting a playful approach to creative tasks are conducive to creative ability.
- The relationship between humor and creativity is discussed with reference to the benefits of humor for creative ability. The impact of humor on cognitive ability in the human brain is explained.

OUTCOMES OF UNIT 7:

After completion of this unit, the student should be able to:

<ul style="list-style-type: none"> • Explain the negative impact that stress has on creative ability with reference to the changes that take place in the neurological mechanisms of the human brain during stressful conditions.
<ul style="list-style-type: none"> • Indicate what is meant by 'alpha' brain waves and mention how they could be induced to enhance creative ability.
<ul style="list-style-type: none"> • Describe the difference between positive stress and negative stress with reference to the conditions needed for each type of stress to occur.
<ul style="list-style-type: none"> • Describe the notion of 'relaxed attention' with regard to its significance for creative ability.
<ul style="list-style-type: none"> • Explain why the pressure of evaluation and grading may reduce an individual's creative ability.
<ul style="list-style-type: none"> • Describe four relaxation techniques that may be used to relieve cognitive and muscular stress that are associated with creative activities and explain the purpose of each technique.
<ul style="list-style-type: none"> • Explain what is meant by an 'automatic anxiety reaction' and how it could be avoided.
<ul style="list-style-type: none"> • Explain why music is effective as a means to enhance creative ability with reference to types of music that are the most conducive to creativity.
<ul style="list-style-type: none"> • Discuss the merits of a playful approach to creative tasks.
<ul style="list-style-type: none"> • Discuss the relationship between humor and creativity with reference to the impact of humor on cognitive abilities in the human brain.

INSTRUCTIONAL METHODS RECOMMENDED FOR THE TEACHING OF UNIT 7:

- Initiate an informal classroom discussion on the factors that students experience as stressors in the educational milieu.
- Provide an opportunity for the students during a classroom session to do the range of relaxation techniques that are provided in the theoretical component. Facilitate the execution of the various steps in the exercises as described in Annexure I and explain the purpose of each technique for the context of graphic design education.

<p>UNIT 8</p> <p>SELF-REGULATION AND CREATIVITY</p>

OBJECTIVE OF UNIT 8:

This unit aims to foster an understanding of the importance of self-regulation, autonomy and individualism for creative ability. It provides an overview of the strategies that were dealt with

in the preceding units and focus on the self-regulative use of these strategies to maximize student's creative abilities.

THEORETICAL FRAMEWORK OF UNIT 8:

- The unit is introduced with a review of the range of behavioral and cognitive strategies which were dealt with in the Learning Program focusing on the 'where, when and how' of each strategy. The self-regulative use of these strategies for the optimization of creative abilities is emphasized.
- The concept of 'self-regulation' is defined with reference to the process of self-generated thoughts, feelings and actions to attain learning goals.
- The relationship between self-regulation and intrinsic motivation is explained, pointing out that when an individual is intrinsically motivated, self-regulation happens automatically.
- The three types of strategy information (conceptual, procedural and conditional knowledge) that are needed to effectively self-regulate are outlined.
- The self-regulative processes of self-observation, self-reaction and self-judgment are explained with particular reference to how they relate to creative ability. Students are made aware of independence and self-regulation as a goal.
- The relationship between self-regulation and cognitive strategies that were taught in Unit 5 such as constructive self-talk and visualization to ensure creative ability is pointed out.
- Students are informed about the value of self-evaluation for self-regulation with reference to the development of objective standards for self-assessment. Emphasis is placed on the detachment of students' egos from their work during self-evaluation. The discussion encourages students to view evaluation as a tool for improvement, rather than an arbitrary or capricious judgment, either by the creator or an outside evaluator.

OUTCOMES OF UNIT 8:

After completion of this unit, the student should be able to:

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|---|
| • List six strategies that may be used to enhance creative ability in the context of graphic design education. |
| • Define the concept of 'self-regulation'. |
| • Discuss the relationship between self-regulation and intrinsic motivation. |
| • State and briefly explain the three types of strategy information that are needed to effectively self-regulate. |

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| <ul style="list-style-type: none">• Describe the self-regulative processes of self-observation, self-reaction and self-judgment with reference to how they relate to creative ability. |
| <ul style="list-style-type: none">• Discuss the importance of self-evaluation for self-regulation with reference to the development of objective standards for self-assessment. |

INSTRUCTIONAL METHODS RECOMMENDED FOR THE TEACHING OF UNIT 8:

- Review of the range of behavioral and cognitive strategies that were dealt with in the preceding units of the Learning Program and encourage students to use these strategies independently to maximize their creativity.
- Ask students to report and comment on their independent use of strategies outside the context of the Learning Program. Identify obstacles and provide guidance regarding the effective implementation of strategies.
- Let students fill in the questionnaire in Annexure H to determine their level of autonomous functioning in a creative context. The results of this questionnaire should correlate with Unit 2's *Intrinsic/extrinsic motivation test*, since autonomy and intrinsic motivation are closely related.
- Provide a summary of the strategies that were dealt with in the Learning Program in a user-friendly hard copy format.

9.2.2 Comments on the implementation of the Learning Program

The proposed Learning Program for creativity studies is a theory-based, time-bound course that teaches students a range of techniques, mind-sets and attitudes which may be used to maximize their own creativity. It aims to provide tuition in the factors that foster and block the flow of creative energy, as well as instruction in the cognitive and behavioral strategies that could be implemented in graphic design education to foster creativity. The program is based on the premise that graphic design students should understand the variables that affect their creativity if they were to control these variables. For example, for students to effectively manage their stress levels, they need to be taught how stress affects their creativity cognitively, behaviorally and psychologically. Knowing how a stressed mind-set could reduce creative ability is the first step to a self-regulative process where students, based on an understanding of the underlying mechanisms of the brain, manage their own stress levels to become active participants in the maintenance of their own creative ability.

The proposed Learning Program is intended to be included in an undergraduate graphic design curriculum on tertiary level as a strategic method to enhance students' creative potential. Although the program is intended to be implemented as an independent module in a broad curriculum, the skills which are taught in the program are applicable to other

modules in the curriculum that require creative thinking. It is expected that the contents and outcomes of the Learning Program should interact with other modules in the graphic design curriculum to enhance student's creative abilities in the various educational contexts of their tuition. To enhance the interaction between modules, creative assignments that students receive in other modules may be used to demonstrate techniques in the Learning Program. Educators involved in the Learning Program could also recommend or facilitate the execution of appropriate divergent thinking techniques for assignments received in other modules.

The question may be raised as to which study year in a graphic design curriculum would be most appropriate to implement the proposed Learning Program. Although the program is likely to have a positive effect on students' creativity in almost any study year, it seems advisable that the program should not be implemented too early or too late in the curriculum. If it is introduced in the junior phase of a curriculum (first and second year) these young students may not yet be aware of the difficulties involved in managing creative ability. They may therefore be less receptive and appreciative of the learning material. If, in a fourth year curriculum, the program is introduced in the final study year, there may not be sufficient time left to develop proficiency and expertise in the skills and techniques taught in the program. It seems therefore, that the third study year in a typical four year curriculum may be an appropriate year for the implementation of the program. Students in their third year of study are mature enough to respond to concepts such as self-regulation, stress management and the conscious control of belief systems that are conducive to creativity. Third year students may also be more acquainted with the factors that impact negatively on their creative abilities. In instances where a graphic design curriculum is spread over three or less years, it still seems appropriate to avoid implementing the program either too early or too late in the curriculum.

The length of a module in creativity studies and the number of classes required per week may vary from institution to institution. Some units may also require shorter teaching hours than others. For example, Unit 4 that focuses on the various creativity techniques might require relative long periods to teach since each technique needs to be thoroughly demonstrated and practiced during classroom sessions. The required teaching time for each unit also depends on the amount of classes per week scheduled for the module. It seems reasonable that the contents of the Learning Program could be covered over a typical six months period with usual holiday breaks in between. However, depending on the intensity and amount of practical exercises accommodated in the program, it could be stretched over a longer period. The next section introduces the second component of the proposed Methodology, namely a range of general educational guidelines for fostering creativity in graphic design education.

9.2.3 GENERAL GUIDELINES FOR FOSTERING CREATIVITY IN GRAPHIC DESIGN EDUCATION

Introduction

The guidelines proposed as the second component of the Methodology are related to the units in the Learning Program in terms of the order in which they are presented and in terms of content. However, these strategies and practices are aimed at the broader educational context and apply to the teaching of other creative modules apart from the Learning Program. The General Guidelines inform educators how to create an educational climate which is supportive of creativity and suggests guidelines for student-lecturer interaction that are hypothesized to be effective strategies for fostering creative abilities in students. The guidelines are supported by the theoretical basis acquired by students through the Learning Program and are therefore related to the program, but they are specifically intended for implementation in other creative or practical modules in the graphic design curriculum.

Unit 1 and Unit 2 of the Learning Program are predominantly introductory, theoretical units that do not as such implicate certain educational strategies outside the context of the Learning Program. The educational guidelines outlined hereunder comprise of strategies that are deducted from Chapters 3-8. They are therefore related to the theory taught in Units 3-8 of the Learning Program and are presented according to the order of these units.

Guidelines deducted from Chapter 3: Intrinsic motivation and creativity (Unit 3)

These guidelines aim to strengthen graphic design students' creative abilities by employing educational practices that support and stimulate their intrinsic motivation. These guidelines are:

- When assessing practical assignments, provide, as far as possible, 'informational' feedback which support students' autonomy and facilitates their competence. Avoid 'controlling' feedback which pressure students to think, feel or behave in specific ways. As a general guideline, focus on positive competency feedback.
- Allow sufficient opportunities for choice regarding materials, techniques, topics and creative approaches in the facilitation of creative tasks. Certain core assignments may be made compulsory, enabling students to choose which extra tasks they prefer to engage in. When students display initiative and are allowed to

choose materials, topics or projects which they find enjoyable, their intrinsic motivation is likely to be enhanced.

- Emphasize enjoyment of practical creative tasks during student-lecturer interaction.
- In order to minimize the potentially detrimental effects of grading on students' creativity, attempt to consciously reduce the relative salience of evaluation procedures during contact sessions.

Guidelines deduced from Chapter 7: Creativity Tools and Techniques (Unit 4)

These guidelines aim to strengthen students' ability to apply the divergent thinking techniques that they were taught in Unit 4 to practical assignments that they receive in modules other than the Learning Program. These guidelines are:

- Facilitate the execution of the divergent techniques during idea generation phases of practical assignments.
- Recommend the implementation of appropriate idea-generation techniques at times when students experience creative blocks.
- Remind students to adopt a relaxed, playful attitude while using the techniques.
- Establish a light-hearted atmosphere in the classroom during brainstorming sessions. Strategies such as the use of music or humor may be introduced to establish a relaxed environment that is conducive to creative thinking.
- Encourage students to use the techniques as often as possible until they are able to use them habitually and effortlessly.
- Remind students to defer judgment of ideas during idea generation sessions. Being critical of concepts as they arise may inhibit responses which could turn out to have creative potential. Do not be critical of wild and crazy ideas.
- Always require that students generate large numbers of ideas during the conceptualization phase of the creative process. Push students to think past the 'safer' ideas that tend to occur first during idea generation.

Guidelines deduced from Chapter 5: Self-belief and creativity (Unit 5)

These guidelines aim to raise students' creative abilities by implementing educational practices that support and stimulate high levels of self-belief in students. These guidelines are:

- Help students to identify habitual thought patterns that limit their creative abilities by listening to their responses during studio sessions. Advise them to replace limiting thoughts with constructive verbal or visualized statements.
- During feedback-sessions, distinguish between students with high and low self-belief levels. Feedback to students who indicate low levels of self-belief should be predominantly positive, even purposefully overlooking weaknesses. It is postulated that if only positive aspects of performance are stressed, weaknesses may be resolved automatically. However, care should be taken that students do not perceive the positive feedback as controlling their behavior. Ideally, feedback should be experienced as informational, affirming one's competence without evaluative or pressuring overtones. Controlling feedback may lead students to hinge their own self-esteem on performance.
- Positive feedback or praise must be delivered contingent on performance of the behavior to be reinforced and be viewed by students as sincere and credible. Thus, positive feedback must not be given regardless of students' actual performance. Providing positive ability feedback (e.g. 'you're good at this') when students have to struggle to succeed will not raise feelings of self-efficacy.
- As a general guideline during feedback, accentuate the positive and de-emphasize the negative. Be cautious of the natural tendency for deficiencies and weaknesses to overshadow the strengths of a creative work.
- Help students to separate their egos from their work. If students' egos are too strongly attached to their work, they will resent criticism and they will stunt their own and the work's progress.
- To differentiate between the student's person and his/her creative work, avoid person-based feedback that uses statements such as 'you can do better than this' or 'I'm disappointed in you'. Essentially, person-based feedback is controlling in nature. The use of affective words such as 'like' or 'dislike' in reactions to artworks should also be avoided. Feedback should remain objective and focus on the strengths and weaknesses of various aspects of the work.
- Be careful not to encourage a view that mistakes are indicators of a student's ability. Rather, encourage the view that mistakes happen to everyone regardless of ability and represent an opportunity to learn.
- When the need arises for negative feedback, provide attributional feedback that purposefully links student performance with one or more reasons for the failure. When the reasons for failure are attributed to controllable factors (e.g. low effort or improper strategy use) it signifies that failure does not result as a lack of ability in the student and self-belief is therefore not affected negatively. Attributional feedback protects students from feeling that *they* are failures, when their *work* fails. For

example, in graphic design education, failure could be attributed to factors such as stress, being extrinsically motivated, incorrect time management or negative thought patterns. Even in instances when causes for failure include personal deficiencies such as laziness, irresponsibility or weak class attendance, it may be helpful to determine the underlying causes for this behavior.

Although this educational practice seems like an emphatic method to assist students in maintaining their self-belief and creative abilities, it should be kept in mind that educators are not psychologists. Assisting students to determine the causes for their failures in creative work may place unrealistic demands on the time and resources of educators. Ideally, students should be informed about effective methods to address the experience of failure in the educational context, as proposed in Unit 5 of the Learning Program. The role that educators play in assisting students to resolve feelings of inabilities that results from failures may be in facilitating and initiating the thought processes referred to earlier. Educators may help students to realize that their perceptions, whether it is related to locus, stability or controllability (based on theory of Unit 5) may not necessarily be objective truths, but may be false perceptions that resulted from a number of negative experiences.

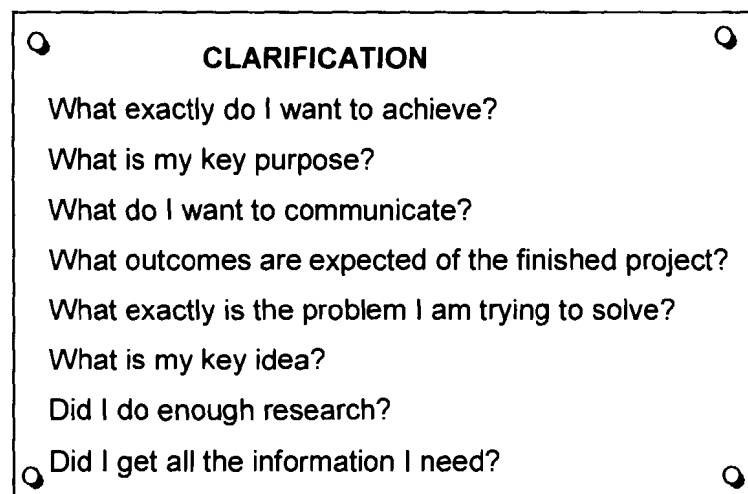
Guidelines deducted from Chapter 8: The creative process (Unit 6)

These educational guidelines aim to strengthen students' creative ability by assisting them to manage the creative process effectively according to the theory provided in Unit 6 of the Learning Program. These guidelines are:

- Facilitate the successful implementation of the various phases of the creative process during the execution of practical assignments. While some phases of the creative process may be completed by students independently, other phases such as the Clarification-phase and the Evaluation-phase may benefit from guidance and facilitation by an educator.
- Advise students to switch phases when they are stuck or when the need for another phase becomes apparent.
- Remind students to adopt the appropriate mind-sets for each phase when facilitating the phases.
- Ensure that students do not skip phases of the creative process and encourage them to employ all the cognitive activities associated with each phase. For example, when weaknesses in creative work are identified during feedback sessions, ask students whether, for example, he or she has employed a Perspiration-phase, or whether

sufficient clarification was done during the creative process. Acknowledge the successful implementation of the various phases by students.

- Allow sufficient opportunities for students to play with the divergent thinking techniques during the Inspiration-phase. Remind them continuously to avoid premature judgment of ideas and encourage them to generate as many ideas as possible. Emphasize the fact that ideas that are generated during the Inspiration-phase should only be viewed as *starting points* for creative solutions that will be refined later in the creative process. It is important that students develop confidence in the implementation of the techniques by experimenting and playing with them on a regular basis. Provide a relaxed, light-hearted atmosphere in the classroom during the Inspiration-phase.
- Display posters containing information on the various cognitive activities and mind-sets of each phase on the walls of studios. For example, a poster that displays the following Clarification-questions could help students to make sure their creative work is still 'on track':



- During the Inspiration phase, bring funny, colorful toys that could make sounds or do interesting movements into the environment where ideas are generated. These help to lighten the mood, induce a sense of play and cause laughter, thus establishing the ideal mind-set for idea generation. The toys may even be used as 'random stimuli' for the execution of the Random Association technique.
- Foster the independent execution of the various phases of the creative process in students. For example, encourage them to develop their own criteria checklists for use during the Distillation- and Evaluation-phases. Emphasize the importance of self-evaluation for creative ability.
- Establish - as far as possible - a comfortable and pleasant environment for students to work in during the Perspiration-phase of their practical assignments. Studio

settings should ideally be conducive to creativity in terms of facilities, equipment and physical conditions such as temperature, light, décor and work-space.

- Encourage students to view the Evaluation-phase as a 'safety net' which allows the Inspiration-and Perspiration-phases to be completely free. Facilitate the implementation of the three-step technique that utilizes the questions of 'what, 'why' and 'how' to evaluate creative work during feedback and evaluation sessions.
- Remind students to detach their egos from their work during evaluation. Since creative work is often a subjective experience, graphic design students may feel that their *person* is being criticized when weaknesses in their work are pointed out. It is important to emphasize that it is the work and not themselves, that is being criticized.

Guidelines deducted from Chapter 6: Stress and creativity (Unit 7)

The following educational practices aim to reduce stress in the educational milieu of graphic design students as a strategic method to maintain students' creative abilities. These guidelines are:

- To reduce the stress associated by evaluation procedures, avoid a classroom atmosphere that places a strong emphasis on evaluation and grading. Students who work under the pressure of a grading system tend to 'play safe' by avoiding creative risks and narrowing their exploration to take easier, less challenging paths to a creative solution.
- To reduce stress that results from students' fear of failure, establish a classroom atmosphere that signifies that it is 'safe' to make a mistake. Emphasize that mistakes are opportunities to learn. The focus should be on the learning process and less on the outcome. Avoid an overemphasis on success.
- Follow the guidelines related to Unit 3 (on intrinsic motivation) and Unit 5 (on self-belief) to reduce the potential stress that is associated with feedback.
- Monitor students' stress levels during practical sessions and facilitate the execution of appropriate relaxation techniques to ensure creative energy (Annexure I). For example, let students do a stretch exercise before brainstorming or after prolonged periods of working at practical assignments, facilitate a neck and shoulder exercise or an exercise that relaxes arms and hands. When students work on computers, it could be helpful to suggest eye-relaxation exercises from time to time. Strained eyes interfere not only with visual thinking but with efficient mental functioning.
- Use music purposefully to enhance creative abilities and reduce stress in the educational environment. For example, lively music could be used to create an informal, spontaneous and open atmosphere in the classroom (may be at the launch

of a new project), while slow, peaceful music could be used to facilitate relaxed states during practical studio sessions. Music with sustained tones and subtle variations including classical, light jazz, electronic and instrumental music of various forms are conducive to creativity. Avoid music with lyrics or music that demands one's attention and music with large, sudden changes in amplitude.

- Encourage a playful approach to creative activity. Playfulness facilitates enjoyment of the creative process, reduces stress and therefore encourages maximum exploration of creative ideas. Use the word 'play' often during instruction and facilitation of creative work. Initiate game-like activities to solve creative problems.
- Use humor strategically in the educational milieu to reduce stress and stimulate creativity in students. This could include showing humorous videos at times (e.g. before brainstorming), telling jokes at times when creative energy in the class seems low, displaying humoristic notes against the walls of the classroom or incorporating humoristic quotes and cartoons in study guides.
- To reduce stress that results from deadlines, provide training in time-management. Avoid the imposition of time schedules that are unrealistically tight.

Guidelines deducted from Chapter 4: Self-regulation and Creativity (Unit 8)

These guidelines aim to strengthen students' creative abilities by implementing educational practices that support self-regulation and autonomy in graphic design students. They are:

- Remind students of the various self-help strategies which were dealt with in the Learning Program and encourage them to use these strategies to overcome creative blocks or to maximize their creativity.
- Recommend appropriate strategies to increase motivation, raise self-belief, reduce stress and maximize cognitive abilities when the need arises. Provide advice on the where, when and how of strategies.
- Provide strategy feedback to inform students about how well they are applying a strategy learned in the Learning Program.
- Establish, as far as possible, a non-authoritarian and non-controlling classroom climate that supports autonomy, individualism and self-regulation in students. Controlling environments that pressure students to think, feel or behave in particular ways reduce their sense of freedom, individuality and autonomy that are needed for maximum creative ability.
- Avoid excessive or unnecessary use of words such as 'should' and 'must' when providing instructions relating to the creative execution of practical assignments.

- Allow students to play a role in choosing the form and amount of instruction they need.
- Establish a classroom climate which is 'psychologically safe' by showing trust, respect and emphatic appreciation for student's creative ideas and talents. These conditions allow students to feel safe enough for creative exploration, risk taking and challenge.
- Balance structure (e.g. scheduled work sessions) with freedom (e.g. choices regarding topics or art materials) in the educational environment.
- Reduce the controlling nature of feedback by asking students purposefully for their opinions. This indicates that their ideas are valued and stimulate their sense of independence. Avoid controlling feedback which indicates that the educator is the primary and sole judge of students' success or failure.
- Emphasize the importance of self-evaluation (Unit 5 teaches students how to do effective self-evaluation). Teach students to view evaluation as a tool for improvement and also to detach their egos from their work during self-evaluation. Encourage them to view their work as though someone else did the work for them. Students should be guided to develop slowly away from dependency on lecturer evaluation towards self-evaluation.
- Ask students to help set the evaluation criteria which are going to be used for assignments. If students formulate their own evaluation criteria for assignments it may contribute to increase their intrinsic motivation, sense of autonomy and ultimately their creativity.
- Allow opportunities for students to set their own proximal (close-at-hand) and long-term goals regarding the completion of their creative assignments. This educational strategy is based on the notion that when students are given a chance to choose their own goals, they are likely to become more motivated to achieve those goals, especially when the goals are carefully and specifically formulated. Since proximal goals promote self-efficacy and motivation better than distant goals (because it is easier to judge progress toward the former) students may be asked to develop their own work schedule for the completion of practical projects. Such a program could include feedback times which students choose according to a timetable. However, it must be kept in mind that students may have difficulties responding to such a flexible system, since they may have been conditioned otherwise by prior educational systems characterized by controlling educational environments. It may also pose problems in terms of assessment if students do not hand in work for evaluation purposes simultaneously. On the other hand, if such a system is introduced, it may be advisable to build on the suggestion made in Unit 2 about reducing the salience of evaluation procedures in order to reduce the effects of extrinsic constraints. While

students may be required to comply with their own schedules for completion of work and minimum requirements for lecturer-student interaction, individual grading of assignments could be replaced with a single end-of-term evaluation session of all the work, as proposed by Jensen (1995:288).

The guidelines presented in this section suggest a range of didactic approaches which may be followed to maintain, stimulate and maximize creativity in graphic design students. They are derived from suggestions, observations and research studies that are documented in literature on creativity. These guidelines are particularly aimed at the strengthening of creative ability in students and may deviate from regular educational approaches. Since their basis is theoretical, it is possible that the implementation of some of these strategies may cause practical problems in the educational context that are not anticipated by the theoretical presuppositions that it is based on. More research (see section 9.5.3) regarding the practicality and usefulness of some of these guidelines for the fostering of creativity may therefore be valuable. Still, they do at least provide a direction for educators who are dedicated to create an educational environment for students that are conducive to creativity.

9.3. Conclusion

To conclude this chapter, the following section examines whether the aims of the study were successfully achieved by means of the research program. It also reflects on the original contribution of the study and finally, offers recommendations for further research.

9.3.1 Were the aims of the study achieved?

The aim of this study was to develop a Methodology that could be implemented in an undergraduate graphic design curriculum to maximize and enhance creative ability in graphic design students. This aim was achieved by the development of a Learning Program that provide tuition in cognitive and behavioral strategies to enhance creativity (section 9.2.1) and the formulation of a range of General Guidelines aimed at the maintenance and support of creativity in students (section 9.2.3). These two components, when used in conjunction with each other, comprise the proposed Methodology that is hypothesized to foster creative ability in graphic design students.

In order to achieve the aim of the study, certain research questions were formulated to guide the investigation. They were:

- (1) What is the definition of creativity?
- (2) Which factors influence an individual's creative ability?
- (3) Can creativity be taught?

- (4) Which cognitive strategies could be followed to foster creativity in graphic design education?
- (5) Which behavioral strategies could be followed to foster creativity in graphic design education?
- (6) What should the core content of a study guide on creativity in graphic design education be?

Given the complexity of the phenomenon of creativity (as discussed in Chapter 2), these questions should be regarded, to a large extent, as open ended constructs which do not lend themselves to clear-cut answers. However, sufficient information on each of these questions was gathered during the course of the study to serve as a basis for the development of the proposed Methodology. The way in which each of these questions facilitated the generation of information that aided the conceptualization of the proposed Methodology will now be briefly outlined.

The first question regarding a definition for creativity was addressed in Chapter 2. Although a number of general issues relevant to the definition of creativity were examined, the discussion specifically intended to formulate an operational definition that is applicable to the particular context of graphic design education. The following definition was formulated and furnished with a motivation for the various constructs implied by the definition:

Creativity is the ability to generate a large number of original responses to a specified creative problem that leads to a functional solution and results in a satisfactory creative product to all major parties involved in the educational process.

This definition is appropriate to the proposed Methodology since it addresses skills and prerequisites for creativity that are integral dimensions of the Learning Program and the General Guidelines. For example, the reference to a 'large number of creative responses' are linked with the principle of 'quantity breeds quality' that is taught in Units 4 and 7. The issue of a 'satisfactory creative product' is also related to the proposed evaluation procedures that are taught in the Methodology. Furthermore, the definition implies that to be able to be creative in the manner suggested by the definition, the range of person-related prerequisites for creativity that are imbedded in the Methodology should be met.

The second research question regarding the factors that influence an individual's creative ability was addressed from a general perspective in section 2.3 of Chapter 2. The section highlighted the fact that creative ability is a vulnerable activity that may be subject to a wide spectrum of influences such as hereditary, personality, educational or social-economic factors. However, four main social-psychological factors that influence creativity were identified and addressed separately in Chapters 3, 4, 5 and 6. Each of these factors

embodies a certain prerequisite for creative ability that are researched and documented frequently in the literature on creativity. They are:

- A high level of intrinsic motivation for the creative task that needs to be accomplished (Chapter 3);
- The ability to maintain autonomous, self-regulative behavior that is conducive to creativity (Chapter 4);
- A healthy self-belief in an individual's creative ability (Chapter 5);
- The minimization of negative stress in the educational milieu where creative tasks are undertaken (Chapter 6).

The principles that underlie each of these factors are taught in Units 3, 5, 7 and 8 of the Learning Program and supported in the General Guidelines related to them. Apart from indicating the main factors that determine creative ability, they also address the research question (5) on which person-related strategies could be followed to foster creativity in graphic design education.

With regard to the third research the question - whether it is possible to teach creativity - it may be concluded, based on the theories, training programs and research studies documented in the preceding chapters, that it is possible to train the cognitive skills, techniques and required mind-sets that are conducive to creativity through interventions such as the proposed Learning Program. Furthermore, if appropriate guidelines (as presented in section 9.2.3) that support the principles contained in the Learning Program are followed by educators, it seems plausible to conclude that creative ability could be purposefully fostered in graphic design students.

The next research question (6) regarding cognitive strategies that could be followed to foster creativity was resolved by the repertoire of cognitive techniques that were proposed in Chapter 7 and 8. Chapter 7 introduced a range of divergent thinking techniques that may be used in graphic design education for creative idea generation. Cognitive strategies to manage the various phases of the creative process are addressed in Chapter 8. These strategies are taught in Units 4 and 6 of the Learning Program respectively and are supported by the General Guidelines related to them. Apart from various cognitive activities suggested for the execution of each phase, Chapter 8 also suggests a range of ideal mind-sets that are useful for each phase. These mind-sets are related to the question (5) regarding person-related strategies to foster creativity. Several of these mind-sets (such as being optimistic during idea-generation) are related to the person-related prerequisites for creativity that are addressed in Chapters 3-6.

The last research question (7) that addresses the problem of which content should be included in a study guide on creativity has been resolved to a large extent by the various issues dealt with in Chapters 2- 8 of the thesis. The proposed content of a study guide in creativity studies is implied by the content of these chapters and are summarized in the theoretical components of the proposed Learning Program (section 9.2.1).

The proposed Methodology offers a model for the fostering of creativity which could be utilized by educational institutions apart from the established method of creativity instruction which tends to rely mainly on task-oriented practical projects for the development of creativity (see Annexure A). It may therefore be concluded that the aim of the thesis was achieved, as far as the development of the proposed Methodology is concerned. However, it must be recognized that creative behavior is not an activity which could be turned on and off by the implementation of certain cognitive and behavioral strategies. Creativity is a vulnerable activity and several factors which are outside the potential control of the educational environment may influence graphic design students' creative ability (as indicated in Chapter 2). It is therefore important to maintain realistic expectations of the proposed Methodology. On the other hand, the various research studies and theories on creativity which are documented in this thesis provide sufficient theoretical evidence to support the hypothesis that the proposed Methodology may increase creative ability in graphic design students. It suggests that although it is not possible to control all the factors which influence students' creativity, if a number of the strategic factors are managed and taught in the educational milieu, creative ability in students may be considerably enhanced.

The study identified a number of factors that tend to either promote or inhibit creativity in the context of graphic design. They are summarized as follows:

Creativity tends to be promoted by:	Creativity tends to be inhibited by:
<ul style="list-style-type: none"> • Being intrinsically motivated for creative work • Focusing on personal goals during creative work • Being unhurried during the creative process • Deferring judgment during idea generation • An optimistic and positive attitude towards ideas, potentials and abilities 	<ul style="list-style-type: none"> • Being extrinsically motivated for doing creative work • Recurrent thoughts of inability • Fear of making mistakes • One's ego being attached to creative work • An inability to self-evaluate creative work • Stress, pressure and anxiety • A tendency to conform • Feeling that mistakes is a lack of talent or

<ul style="list-style-type: none"> • Adopting a playful attitude during idea-generation • Employing a 'perspiration phase' to maximize the creative potential of ideas • Being able to persist and persevere through difficulties • Enjoying creative work • Being able to learn from failures and successes • Using word-games and divergent thinking techniques such as Random Association and the Six Universal Questions technique • Exposing and understanding all the dimensions of a creative problem • Detaching one's ego from creative work during evaluation • Allowing periods of rest and relaxation between periods of creative effort • Deliberately employing incubation strategies • Being unwilling to conform • Believing in the attainability of a creative solution during the creative process • Being able to produce large quantities of ideas during idea generation • Being able to replace negative thoughts of inability with constructive self-talk • Being able to self-evaluate work effectively • Working in a state of 'relaxed attention' • Employing relaxation techniques when needed • Using music during work sessions • Humor and a light-hearted disposition • An ability to self-regulate feelings and actions • Receiving informational feedback • Having sufficient choice opportunities regarding materials, techniques or topics • Receiving positive competency feedback 	<p>ability</p> <ul style="list-style-type: none"> • Giving up too soon when difficulties occur in the creative process • Neglect to employ a 'perspiration' phase to maximize creative potential of ideas • Salient evaluation procedures • Surveillance • Judging ideas too soon during idea-generation • By accepting ideas too soon during idea generation • Being too serious during idea generation • Feeling one's person is criticized when work is criticized • A lack of choice regarding materials, techniques or topics • Negative or pessimistic attitudes towards creative work • A authoritarian, controlling classroom climate • By an overemphasis on success • By an inability to learn from failures or successes • Feedback that pressure students to think, feel or behave in specific ways • Feedback that judge a person and not the work • By reacting to creative work in terms of 'likes' or 'dislikes' • Educators using words such as 'should' and 'must' during instruction • Negative feedback on creative work • An inability to self-regulate feelings and actions • Failing to produce large quantities of ideas during idea generation • Self-doubt • Lack of time to conduct creative work • Being scared to rake risks • Being depressed
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<ul style="list-style-type: none"> • Not being afraid to make mistakes • Evaluation procedures made less salient • Understanding and addressing the reasons for failures and mistakes • A classroom atmosphere that signifies that it is 'safe' to make a mistake • A non-authoritarian and non-controlling classroom climate • A sense of self-determination • Educators who promote autonomy and individualism • Educators who show trust, respect and appreciation for creative ideas and talents • A balance between structure and freedom in the educational environment 	
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9.3.2 Reflections on the contribution of the study

This study suggested that two interactive methodological processes underlie the deliberate fostering of creativity in graphic design education. The first process involves the implementation of a structured training program (the Learning Program) in creativity studies and the second approach involves a process of maintenance and support of a variety of social-psychological prerequisites needed to sustain creative ability (the General Guidelines). These two interdependent components are intended to be used in conjunction with each other to maximize the beneficial effects of the proposed Methodology on students' creativity.

Besides the interdependency of the two main components of the Methodology, this study indicated that each of the separate strategies contained in these two processes are interactively reliant on each other. For example, the creativity techniques that are taught in Unit 4 have the potential to enhance several of the person-related strategies described in Part 1 of the thesis. When students feel confident and proficient in the use of the creativity techniques, it may help to build intrinsic motivation (Unit 3); equally, if creative results are achieved through the use of the techniques it could help to foster self-belief in students (Unit 5). Additionally, since the techniques could be used as self-help strategies it may contribute to the development of autonomy in students (Unit 8). Furthermore, in view of the fact that the techniques have a certain 'reliability' built into them (de Bono, 2004) it could be an important strategy to reduce stress and feelings of inability in students (Unit 7).

The person-related strategies also seem to have a beneficial influence on each other. For example, students who are intrinsically motivated (Unit 3), autonomous (Unit 8) and believe

in their own creative ability (Unit 5) are likely to be less prone to anxiety and stressful conditions in the educational environment (Unit 7). In addition, students who believe they are competent (Unit 5) enjoy tasks more and display greater intrinsic motivation (Unit 3) than do students who judge their abilities lower. There also exists an interdependent relationship between self-regulation (Unit 8) and intrinsic motivation (Unit 3). Amabile (1983:118) pointed out that one of the hallmarks of self-regulation is intrinsic motivation. Deci and Ryan (2000:15) have hypothesized that the need for self-determination (autonomy) underlies intrinsic motivation and that the same contextual factors supporting self-regulation will also maintain or enhance intrinsic motivation for that activity.

The experience of autonomy is also dependent on the strategies taught in Unit 5 that deals with self-belief. The ability to perform independent judgment and self-regulation is exceedingly reliant on sufficient levels of self-belief (Petty, 1997:154). Indeed, self-regulation is often a by-product of self-belief. Mc Combs (2001:78) also noted that there are direct ties between self-structures (what individuals think, feel and believe about themselves) and self-regulation. In fact most of the strategies contained in the Methodology, including the cognitive strategies taught in Units 4 and 6 are reliant on the cultivation of self-regulation (Unit 8). Both the implementation of creativity techniques (Unit 4) and the successful execution of the various phases in the creative process (Unit 6) are essentially self-regulated activities. Therefore, although each strategy may contribute to the fostering of creativity in graphic design students, creativity is expected to be significantly enhanced when the cognitive and the social-psychological strategies are combined in one comprehensive Methodology.

However, as mentioned earlier, it should be kept in mind that creative ability may be susceptible to the influence of several factors which are outside the potential control of the educational milieu. Some behavioral orientations that are addressed in the Methodology such as intrinsic motivation and self-belief may have deep personal and psychological roots and should not be oversimplified. For example, although a large body of research supports the notion that intrinsic motivation, as opposed to extrinsic motivation, is conducive to creativity, there may be conditions in which intrinsic motivation may not be affected by extrinsic constraints (as outlined in Chapter 3). The same activity can also be intrinsically or extrinsically motivating for one individual, but intrinsically motivating for another. Nevertheless, the variables that are included in the proposed Methodology were selected on the basis that they represent the prerequisites for creativity that are researched and documented most frequently in the literature on creativity - indicating their importance for the maintenance of creative ability. The variables are also particularly relevant and applicable to the context of graphic design education.

The various focuses of the proposed Methodology correlate with several other proposed models for the fostering of creativity. For example, the five main goals and objectives prescribed by Colangelo and Davis (1991:239) for teaching creative thinking are addressed in various ways by the proposed Learning Program and the General Guidelines. They are: (1) foster creativity consciousness and creative attitudes; (2) improve the students meta-cognitive understanding of creativity and creative people; (3) exercise creative attitudes; (4) teach creative thinking techniques; (5) involve students in creative activities.

Adam (1996:56) also proposed a range of prerequisites for a creativity course syllabus that correlates significantly with the proposed Methodology. They are: (1) cultivate an understanding of those characteristics that make one person creative and another not so creative; (2) teach how creativity comes about; (3) teach the processes that creative people engage in as they become absorbed in creative work; (4) teach the features or qualities that make one product earn the label 'creative'; (5) foster an understanding of the kind of settings or environment that will facilitate and enhance the expression of a creative act. Davis's (1982:27-29) four-step model of creativity development show similarities with the proposed Methodology too. In general, his model suggests that to become a creative person one must (a) cultivate awareness, that is, increase one's creativity consciousness (b) understand the topic of creativity, (c) use creative thinking techniques, and (d) be self-actualized. These models suggest that the most effective methods for stimulating creativity involve both cognitive and affective factors, as suggested by Fasko (2001:325). All of these approaches, as well as the proposed Methodology, imply a comprehensive and holistic approach to the teaching of creativity.

Indeed, this study indicated that creative ability does not arise only from cognitive skills but from a constellation of psychological, affective, motivational and personal properties. Although it used to be believed that cognition and affect are largely separated (Caine, 2004:12), this study highlights the interconnectedness between cognitive and affective dimensions of creativity. The fact that emotion is integral to reasoning is part of contemporary views on human ability. This is illustrated in, for example, the work of neuroscientists such as Candace Pert in her book *Molecules of emotion* (2003). When both cognitive and affective aspects are addressed in the pursuit of fostering creativity it demands an all-inclusive approach to the problem - as reflected in the proposed Methodology. Thus, the proposed Methodology addresses to a certain extent the need for a comprehensive theoretical construct aimed at the fostering of creativity that was recognized by Amabile (1983:209) when she remarked:

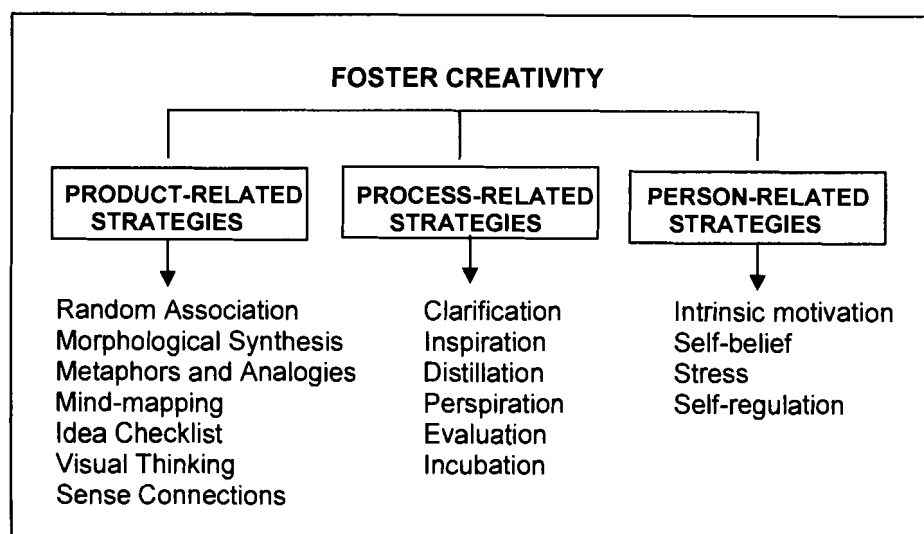
The nature of creativity is such that a complete and useful theory for the fostering of creativity cannot be a single, simple theoretical statement. Rather, it will be a complex model involving many classes of factors that contribute to the final creativity of a product or response. The painstaking effort required to formulate such a model is more than justified by the theoretical and practical importance of the result for students in many disciplines.

To conclude: this study established a model for the fostering of creativity in graphic design education. A 'model' used in this sense refers to a 'standard to be imitated' as explained in Chapter 1. The proposed Methodology may thus be viewed as a standard model that may be used to purposefully develop creativity in graphic design education. The Methodology comprise of a range of cognitive and behavioral strategies that could be divided into three key dimensions:

- **product-related strategies:** these are a range of divergent thinking techniques that could be used in graphic design education to stimulate and promote idea-generation for creative products;
- **process-related strategies:** these strategies focus on the effective management of the various phases of the creative process in graphic design education;
- **person-related strategies:** these are social-psychological strategies that may be used in graphic design education to stimulate and maintain creative ability in students.

These three dimensions form the main framework for the proposed model that may be imitated by institutions that offer graphic design tuition. A simplified version of the proposed model, termed a *Three dimensions model*, is summarized in the following diagram.

Figure 9: A proposed *Three dimensions model* for the fostering of creativity in graphic design education



9.3.3 Recommendations for further research

The proposed Methodology is a theoretical construct based on a synthesis of creativity models, theoretical frameworks, training programs and research studies documented in the literature on creativity. Certain aspects of the proposed Methodology, such as intrinsic motivation and divergent thinking techniques, are supported by significant bodies of research that indicate their importance for the fostering of creativity. Many of these research studies are discussed in the thesis. However, although their findings confirm their importance for creative ability, most of these studies were not aimed at the specific context of graphic design education. It would therefore be valuable if further studies could investigate the impact of certain person-and process based strategies proposed by the Methodology. Aspects such as the effects of stress and self-belief on creativity have been documented in literature and are supported by research studies on related aspects, but lack experimental research to confirm their impact on creativity in the specific context of graphic design education.

Runco (2003:137) noted that in contemporary creativity studies, many empirical papers are published each year, testing new and old hypotheses and covering an increasingly diverse range of topics. He points out that the field of creativity studies has become very scientific in its use of rigorous empirical work and this empirical work has advanced the field, especially in the last two decades. However, in his summary of what is needed in the field of creativity studies, Mumford (quoted in Runco, 2003:137) calls for more integrative models of the creative process as well as further work on measurement, sampling and tests. Donnelly (2004:156) also points to the relative lack of cross-fertilization between the various fields that investigate creativity, stating that it is 'not surprising given the relative youth of the creativity field'. This study, which integrates a wide range of disciplines, could partly contribute to the gap in literature that Mumford and Donnelly refers to, but highlights the need for empirical work related to the particular context of graphic design education. Indeed, a number of testatable hypotheses that could be taken up by further research are suggested by the proposed Methodology.

Examples of these include:

- An investigation on the impact of evaluation procedures on graphic design students' creative abilities. Although the effects of evaluation on creativity have been studied by researchers such as Amabile (1983, 1996), it seems useful to investigate the matter specifically in the context of graphic design education. Several of the studies that were referred to in Chapter 3 suggested that evaluation, or the expectation of evaluation, reduce creative abilities in a person. It may be useful to determine the effects of reduced salience on evaluation procedures on students' creative ability by replacing for example, continuous grading with a single end-of-term event.

- Another aspect that may be investigated through further research are the extent to which the divergent thinking techniques proposed in Chapter 7 contribute to enhance graphic design students' creative abilities. Such studies may involve that originality and the number of creative ideas generated by students when they use the techniques is compared to these aspects in a control group that did not receive tuition in the techniques.
- The effects of certain forms of stress that are typical of the educational milieu on graphic design students' creative abilities may also be investigated by further research. Various interventions that create stressful conditions for students could be established such as the use of controlling feedback, the imposition of unrealistic deadlines or the extreme salience of evaluation procedures. Amabile *et al.* (1996:15) points out that in most previous research on the work environment for creativity, there has been a bias toward creativity supports-work environment factors that appear to enhance creativity. They observed that there is comparatively little research evidence on creativity impediments-work environment factors that may undermine creativity.
- An investigation on the effects of various styles of feedback on students' creative abilities could be of particular value to the proposed Methodology. In his discussion on feedback styles that influence creativity, Petty (1997:147) notes that 'ignoring the negative and focusing only on the positive may not be as dysfunctional as it seems'. To illustrate this point he refers to a study where researchers observed people learning how to bowl. One group of learners was told only of their weaknesses and the other group was told only of their strengths. The results of the study indicated that the latter improved their bowling much faster. It seems that if weaknesses are purposefully overlooked, stressing only positive aspects of performance, the weaknesses are resolved *automatically*. Petty postulates that learners will easily find and correct weaknesses *unaided* if the emotional climate is positive and affirming. If this hypothesis could be tested in the context of graphic design education, it could help to determine styles of feedback that are conducive to the fostering of creativity in students. Studies on the impact of other feedback styles on students' creativity, such as attributional feedback or controlling feedback may also be useful. This suggestion for further research may be linked to Rank's *et al.* (2004:526) call for more research on applied psychology and creativity.
- Future research studies may also investigate specific mechanisms that account for the connection between play and creativity, determining the relationship between divergent thinking and playful attitudes or interventions in graphic design education. This need was also addressed by Russ (2003:291) who aimed to determine whether processes in play simply reflect processes that are important in creativity or whether play actually facilitates creative ability. According to her, this question is important

because it speaks to whether or not play intervention programs should be developed in order to facilitate creative ability. Although studies on creativity and play have been conducted in other fields such as psychology and pre-school education, future studies that examine their relationship in graphic design education may be undertaken.

- The potential of humor to facilitate creative thinking in graphic design education may be examined in future studies. Many theorists have suggested a close association between creativity and humor. Wycoff and Pryor (2003:35) notes in their article on research that investigates the relationship between creativity, humor and cognitive processing, that humor tends to set the mind into modes of thinking that are investigative, seeking, grasping and filled with trial-and-error. The impact of humor on creativity has been studied in other fields such as the study by Treadwell (in Amabile, 1983:179). In this study, students listened to a recording of a popular comedian before completing some sections of the *Torrance tests of creative thinking*. Although there was no direct connection between the comedian's material and the test requirements, students who had listened to the recording scored significantly higher on fluency, flexibility and originality (Torrance's hallmarks of creativity) than students who had not. The results suggest that prior exposure to humor may be conducive to creativity, possibly due to its relaxing effects on the brain (Amabile, 1983:179). Therefore, it seems recommendable that the impact of certain interventions on creativity such as the use of humorous movies, cartoons or jokes that establish a light-hearted classroom atmosphere may be researched in the particular context of graphic design education.
- The potential role of the physical environment in fostering creativity may be examined by future research. Mc Coy and Evans (2002:409) in their article that reports on findings of two studies on the role of specific interior design elements on creativity, notes that the focus of much creativity research has been on person-related dimensions of creativity, to the exclusion of potential contributions on the impact of the physical environment on creative ability. Mc Coy and Evans (2002:415) found, for example, that cool colors had a significant negative correlation with creative potential. More research that examines the role of the physical environment in fostering creativity with a particular focus on the educational environment may be valuable.
- Finally, the impact of music (or certain types of music) on student's creativity when used strategically in the educational context could be investigated. According to Grovè, (1992:111-112) several research studies confirm that certain types of music have significant abilities to reduce stress in individuals and simultaneously raise cognitive abilities such as memory, concentration and insight. Music has also been found to affect people's brain waves, often inducing alpha brain waves which are associated with relaxation, higher levels of creativity and an increase in cognitive

abilities (Muller, 2001:10). Music is also postulated to elicit emotional responses by stimulating the limbic system, to activate the right brain and to 'energize' the brain (Jensen, 1995:218-219). These observations suggest the hypothesis that the use of music may increase creative ability in students when used as an educational strategy in graphic design tuition. Future studies that aim to test this hypothesis may therefore be undertaken.

These suggestions provide a number of directions that may be followed by further research studies. The findings of such studies may help to refine the guidelines and suggestions contained in the proposed Methodology for fostering creativity in graphic design education. Since the proposed Methodology is a theoretical model based on prior research studies and various theories on creativity, research that investigates these constructs experimentally may be particularly useful to verify the value of the proposed Methodology.

CHAPTER 1: ANNEXURE A

List of educational institutions in South Africa that were contacted to determine whether they provide formal training in creativity studies as part of their graphic design curricula.

- 1. Institution:** Inscape Design College
Address: Box 87605, Houghton, South Africa
Telephone: +27 (21) 365 1208; +27 (21) 361 6183
E-mail address: info@inscape.co.za
Web Address: <http://inscape.co.za>

- 2. Institution:** Cape Peninsula University of Technology
Address: Box 652, Cape Town, 8000, South Africa
Telephone: +27 (21) 460 3911
Fax address: Fax: +27 +21 460 3698
Web Address: <http://www.cput.ac.za>

- 3. Institution:** University of Pretoria
Address: Department of Visual Arts, University of Pretoria, 0002, Pretoria, RSA.
Telephone: + 27 (12) 420 2353
E-mail address: sauthoff@postino.up.ac.za
Web Address: <http://www.up.ac.za>

- 4. Institution:** Stellenbosch University
Address: Privaatsak X1, Matieland, 7602, Suid-Afrika
Telephone: +27 (21) 808-9111
E-mail address: fvpn @ maties.Sun.ac.za
Web Address: <http://www.sun.ac.za>

- 5. Institution:** Tshwane University of Technology
Address: Private Bag X 680, Pretoria, 0001, South Africa
Telephone: (+27 12) 318-5911
E-mail address: general@tut.ac.za / lgrangg @ techpta.ac.za
Web Address: www.tut.ac.za

(Chapter 1: Annexure A continues on the next page)

(CHAPTER 1: ANNEXURE A CONTINUED)

6. Institution: The Open Window School of Visual Communication
Address: P.O. Box 74841, Lynnwood Ridge, South Africa, 0040
Telephone: +27 (12) 470 8681
E-mail address: info@openwindow.co.za
Web Address: <http://www.openwindow.co.za>

7. Institution: University of Johannesburg
Address: PO Box 524, Auckland Park, 2006, South Africa
Telephone: +27 (011) 489-2911
Fax number: +27 (011) 489-2191
Web Address: <http://www.uj.ac.za>

8. Institution: Vaal University of Technology
Address: Private Bag X021, Vanderbijlpark, 1900, South Africa
Telephone: +27 (16) 950 9272
Fax number: +27 (16) 950 9768
Web Address: <http://www.vut.ac.za>

CHAPTER 1: ANNEXURE B

List of international institutions on the Internet that were examined to determine whether their curricula offer formal training in creativity studies.

Institution: The Art Institute of Seattle
Address: 2323 Elliott Avenue, Seattle, WA, 98121
Telephone: Toll-free 1-800-275-2471, Local 206-448-0900
Web Address: <http://www.ais.edu>

Institution: Grafisch Lyceum Rotterdam: Institute for Graphic Design
Address: Heer Bokelweg 255, 3032 AD Rotterdam, Netherlands (Holland)
Telephone: +31 (10) 880 25 00
Fax number: +31 (10) 880 25 56
Web Address: <http://www.glr.nl/>

Institution: Ontario College of Art and Design
Address: 100 Mc Caul, St. Toronto, M5T, 1W1, Canada
Telephone: +1 (416) 977 5311
Fax number: +1 (416) 977 0235
Web Address: <http://www.ocad.on.ca>

Institution: Al Collins Graphic Design School
Address: 1140 S. Priest, Dr. Tempe, AZ 85281, United States.
Telephone: +1 (480) 966 3000
Fax number: +1 (480) 966 2599
Web Address: <http://www.alcollins.com/>

Institution: Edinburgh College of Art
Address: 74 Lauriston Place, EH3 9DF Edinburgh, United Kingdom (UK)
Telephone: +44 (131) 221 6000
E-mail address: m.p.hall@eca.ac.uk
Web Address: <http://www.eca.ac.uk/>

(CHAPTER 1: ANNEXURE B CONTINUED)

Institution: University of Newcastle
Address: University Drive, Callaghan, NSW 2308, Australia
Telephone: +61 (2) 4921 5000
Fax number: +61 (2) 4921 6922
E-mail address: admissions@newcastle.edu.au
Web Address: <http://www.newcastle.edu.au/>

Institution: California State University-Northridge
Address: 18111 Nordhoff, Northridge, A 91330, United States (U.S.A.)
Telephone: +1 (818) 885 1200
Fax number: +1 (818) 885 3046
Web Address: <http://www.csun.edu/>

Institution: Georgian College of Applied Arts and Technology
Address: One Georgian Drive, Barrie, L4M 3X9, Canada
Telephone: +1 (705) 728 1968
Fax number: +1 (705) 722 5170
Web Address: <http://www.georcoll.on.ca/>

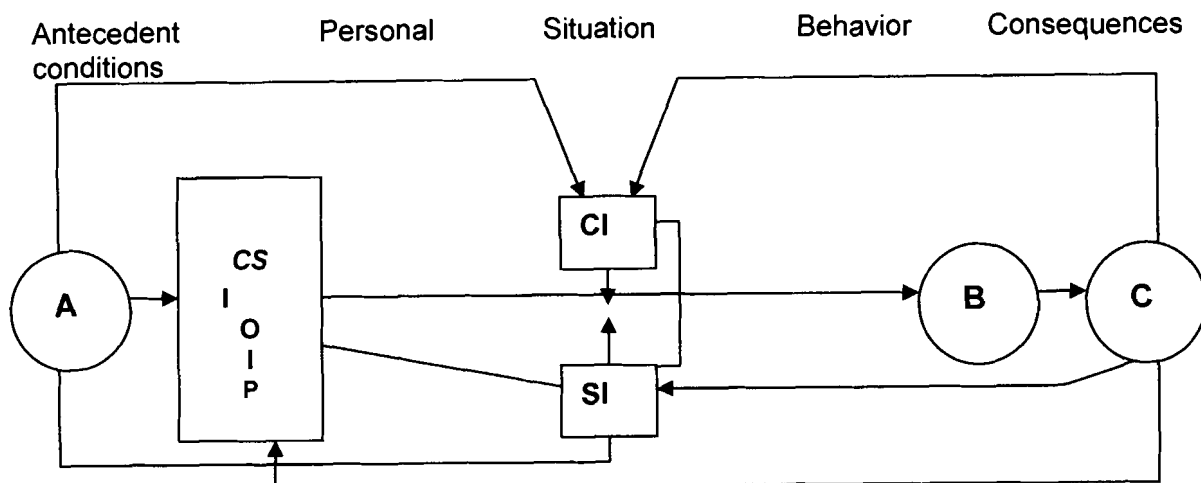
Institution: Art Institute of Los Angeles
Address: 2900 31st Street, Santa Monica, CA 90405-3035, United States (U.S.A.)
Telephone: +1 (310) 752 4700
Fax number: +1 (310) 752 4708
Web Address: <http://www.artinstitutes.edu/>

Institution: American Academy of Art
Address: 332 South Michigan Ave., #300 Chicago, IL 60604-4302, United States
Telephone: +1 (312) 461 0600
Fax number: +1 (312) 461 0699
Web Address: <http://www.aaart.edu/>

Institution: Art Institute of Philadelphia
Address: 1622 Chestnut, Philadelphia, PA 19103 United States (U.S.A.)
Fax number: +1 (215) 246 3339
E-mail address: wrightme@aia.edu
Web Address: <http://www.aiph.aia.edu/>

CHAPTER 2: ANNEXURE C

Woodman and Schoenfeldt's (1989:81) *Interactionist model of creative behavior*



A = Antecedent Conditions

B = Creative Behavior

C = Consequences

Examples:

Past reinforcement history;
Early socialization;
Biographical variables – sex;
Family position, birth order

O = Organism (person)

Gestalt of attitudes, values, intentions to behave, motivational orientations and individual differences.

CS = Cognitive Style / Abilities

Examples:

Cognitive complexity
Divergent thinking
Verbal / ideational fluency
Problem-solving styles / approaches
Perceptual openness
Field independence / dependence

P = Personality Dimensions / Traits

Examples:

Locus of control
Dogmatism
Autonomy
Self-esteem
Narcissism
Intuition

CI = Contextual Influences

Examples:

Physical environment
Culture
Group / organization "climate"
Task and time constraints

SI = Social Influences

Examples:

Social facilitation
Evaluation expectations
Rewards / punishments
Role modeling

CHAPTER 2: ANNEXURE D

Extraction from the website, *Creativity and innovation: Mycoted*. Alphabetical list of creativity techniques ([Web:] <http://www.mycoted.com/services/services.php>).

Creativity Techniques

Below are listed a number of creativity techniques to help with creative thinking. Like most tools these creativity techniques all have their good and bad points. I like to think of these creativity techniques as tools in a toolbox in much the same way as my toolbox at home for DIY. It has a saw, spanner, hammer, knife and all sorts of other things in it, they are all very useful, but you have to pick the right tool (creativity technique) for each job. We will try and provide a little guidance along with each tool to let you know whether it's best used for cutting paper or putting in nails.

There are at least 200 different creativity techniques and tools available, listed below are some of these. Special thanks to the Open University for their kind permission to use material from their publication B822.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

Alternative Scenarios
Analogies
Analysis of Interactive Decision Areas (AIDA)
Anonymous voting
Assumption surfacing
Attribute listing (and variants)

B

Backward Forward Planning
Boundary examination
Boundary relaxation
Brainstorming
Brain sketching
Brain Writing
Brain writing 6-3-5
Brain writing game
Brain writing pool

Browsing

Brutethink

Bug listing

Bullet proofing

Bunches of bananas

C

Card story boards
Cartoon story board

Annexure D continues on the next page

K

Keeping a dream diary
Kepner and Tregoe's method
KJ-method

L

Laddering
Lateral Thinking
Listing

Listing pros and cons

M

Metaplan information market
Mind-mapping
Morphological analysis
Morphological Forced Connections
Multiple redefinition

N

Negative brainstorming
Nominal group technique (NGT)
Nominal-interacting technique
Notebook

O

Observer and merged viewpoints
Osborn's checklist
Other people's definitions
Other people's viewpoints

ANNEXURE D CONTINUED

CATWOE

Causal mapping

Charrette

Cherry Split

Circle of Opportunity

Clarification

Classic Brainstorming

Collective notebook (CNB)

Comparison tables

Component detailing

Concept Fan

Consensus mapping

Constrained brain writing

Contradiction Analysis

Controlling imagery

Crawford slip writing

Creative problem solving (CPS)

Criteria for idea-finding potential

Critical path diagrams (CPD)

D

Decision seminar

Delphi

DO IT

Dialectical approaches

Dimensional analysis

Drawing

E

Essay writing

Estimate-discuss -estimate

Exaggeration (magnify or minify)

Excursions

F

Factors in 'selling' ideas

False Faces

Fishbone diagram

Five W's and H

Flow charts for action planning

Focus groups

Focusing

Force-field analysis

Force-fit game

Free association

Annexure D continues on the next page

P

Paired comparison

Panel consensus

Paraphrasing key words

Personal balance-sheet

Phases of integrated problem solving (PIPS)

Pictures as idea triggers

Pin cards

PMI (Plus, Minus, Interaction)

Plan Do Check Act (PDCA)

Plusses, potentials and concerns

Potential-problem analysis (PPA)

Preliminary questions

Problem-centered leadership (PCL)

Problem inventory analysis (PIA)

Problem Reversal

Progressive hurdles

Progressive revelation

Provocation

Q

Q-sort

Quality circles

R

Random stimuli of various kinds

Rawlinson Brainstorming

Receptivity to ideas

Reframing values

Relational words

Relaxation

Reversals

Role storming

S

7-Step Model

SCAMMPERR

SCAMPER

Sculptures

Search conference

Sequential-attributes matrix

Similarities and Differences

Simple rating methods

Simplex

Six Thinking Hats

Slice and Dice

ANNEXURE D CONTINUED

'Fresh eye' and networking

G

Gallery method

Gap analysis

Goal orientation

Greetings cards

H

Help, hinder

Heuristic ideation technique (HIT)

Highlighting

I

Idea advocate

Imagery for answering questions

Imagery manipulation

Imaginary Brainstorming

Implementation checklists

Improved nominal group technique

Interpretive structural modeling

J

V

Value brainstorming

Value engineering

Visual brainstorming

Visualising a goal

W

Who are you?

'Why?' etc. - repeatable questions

Wishing

Working with dreams and images

X

Y

Z

Snowball technique

Soft systems method

Stakeholder analysis

Sticking dots

Stimulus analysis

Story writing

Strategic assumption testing

Strategic choice approach

Strategic management process

Strategic Options Development and Analysis (SODA)

Successive element integration

Super Group®

Super heroes

SWOT Analysis

Synectics

Systematized Direct Induction (SDI)

T

Technology Monitoring

Think Tank

TILMAG

Transactional planning

Trigger Sessions

Trigger method

TRIZ

U

Using 'crazy' ideas

Using experts

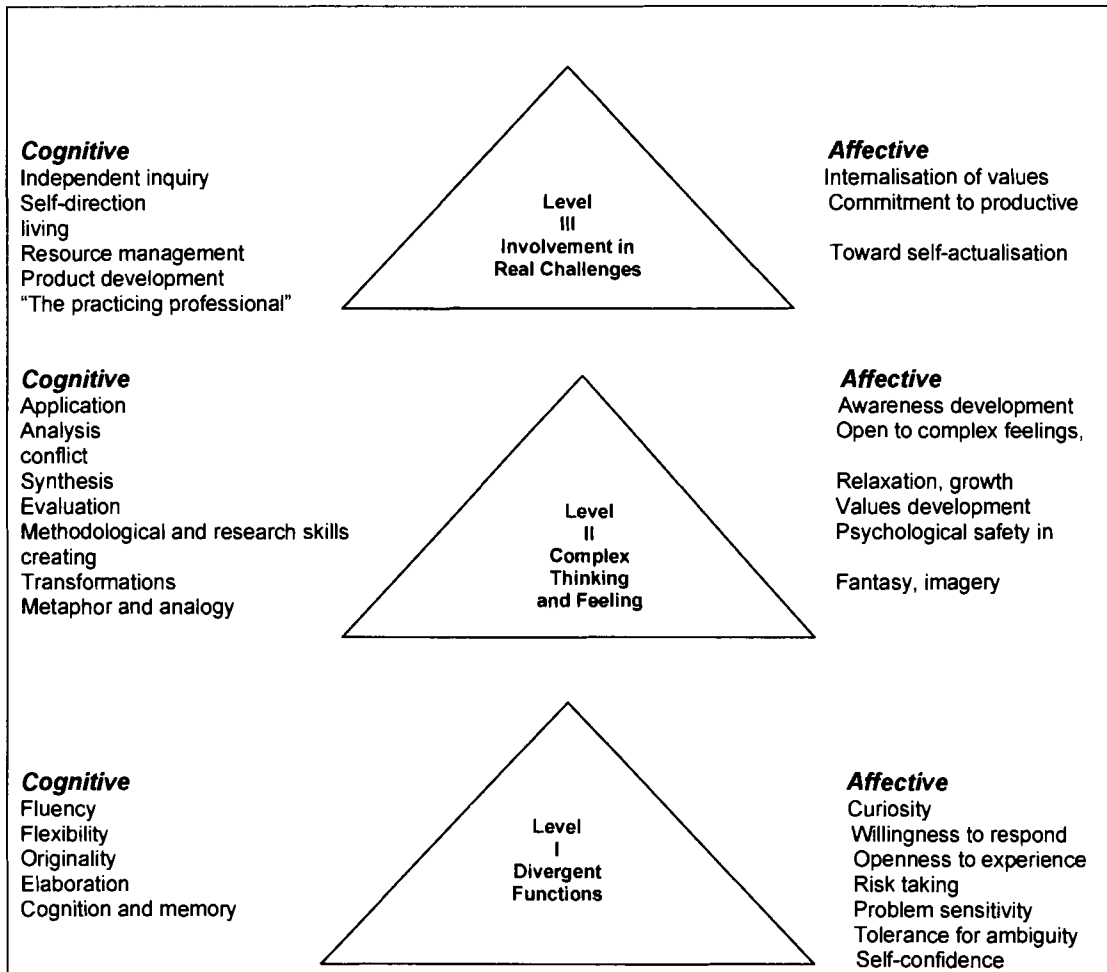
CHAPTER 2: ANNEXURE E

List of the main characteristics of well-known creativity training programs, listed by Cropley (1997:86)

Program	Age Level	Material	Aimed at promoting
Imagi / Craft	Elementary School	Dramatized recordings of great moments in the lives of famous inventors and discoverers	-The feeling that their own ideas are important. -Career aspirations of a creative kind -Widened horizons
Creative Problem Solving	All levels	No special material- makes great use of brainstorming	-Problem finding - Data collection -Idea finding -Solution finding, -Implementing of solutions
Talents Unlimited	All levels	Workbooks based on idea "inventive thinking," aimed at problem solving- emphasis on brainstorming	-Productive thinking -Communication -Planning -Decision making
Productive Thinking Program	Fifth- and Sixth-grade pupils	Booklets containing cartoons	-Problem-solving abilities Attitudes toward problem solving
Purdue Creative Thinking Program	Fourth-grade pupils	Audiotapes and accompanying printed exercises	-Verbal and figural fluency, flexibility, originality, and elaboration
Osborn-Parnes Program	High school and college students	No special materials	-Getting many ideas -Primary emphasis on brainstorming, with separation of idea generation and idea evaluation
Myers-Torrance Workbooks	Elementary school pupils	Workbooks containing exercises	Perceptual and cognitive abilities needed for creativity
Khatena Training Method	Adults and children	No special materials; simple teacher-made aids are employed	-Ability to break away from the obvious -Transposing ideas -Seeing analogies -Restructuring information -Synthesis of ideas

CHAPTER 2: ANNEXURE F

Treffinger's (1992:431) *Creative learning model*



CHAPTER 3: ANNEXURE G

Amabile's (1989:64-67) *Intrinsic /extrinsic motivation test* adapted for application to graphic design education.

This test was devised by Amabile to identify intrinsic motivation or extrinsic motivation for a particular activity in young individuals. Amabile's test provides an open space to fill in the particular activity that the test is used for. For the purposes of this thesis, the spaces are filled in to refer to graphic design activities.

The test includes sixteen *intrinsic* statements (marked with I) and sixteen *extrinsic* ones (marked with E). Each statement should be marked a true or false. If there are more true responses to the *intrinsic* statements, the person is primarily intrinsically motivated toward the activity. If there are more true responses to the *extrinsic* statements, the person is probably more extrinsically motivated.

- | | | |
|---------|-----|---|
| I _____ | 1. | I have nagged my parents so they would allow me to do graphic design. |
| E _____ | 2. | I think a lot about the good things my parents or teachers will say when I do successful designs. |
| I _____ | 3. | When I study graphic design, I feel that I am learning things I really want to know. |
| I _____ | 4. | When I have the choice of many different things to do, I often choose drawing, designing or being creative. |
| E _____ | 5. | I want my parents and lecturers to know how good I really can be at graphic design. |
| I _____ | 6. | I do graphic design because I'm really curious about it. |
| E _____ | 7. | I hope that someday I'll make a lot of money doing graphic design. |
| E _____ | 8. | I like it when someone watches me do drawing, scamping, designing. |
| I _____ | 9. | The more challenging a design task is for me, the more I enjoy it. |
| E _____ | 10. | I do graphic design because my parents or teachers have told me I have a talent for it. |
| I _____ | 11. | I really enjoy seeing what I've done in graphic design. |
| E _____ | 12. | I do graphic design mostly because my parents or teachers want me to do it. |

Annexure G continues on the next page

(ANNEXURE G CONTINUED)

- I _____ 13. I like figuring things out for myself when I do design work.
- E _____ 14. When I'm designing a project, I think about what other people will say when I'm finished.
- I _____ 15. For me graphic design is more like playing than like work.
- I _____ 16. Sometimes, when I'm designing or being creative, I forget about everything else.
- E _____ 17. I believe there's no point in doing great design work if nobody else knows about it.
- I _____ 18. I feel really good when I know I'm doing well in graphic design.
- E _____ 19. A lot of times, I do graphic design projects without really feeling like it.
- I _____ 20. When I do creative work and design, I like deciding for myself how I'm going to do it.
- E _____ 21. I like it when somebody guides me by telling me how to make better designs.
- I _____ 22. I'd be really disappointed if I couldn't do graphic design anymore.
- E _____ 23. I do graphic design because other people have told me I'm good at it.
- I _____ 24. I have a lot of fun doing graphic design.
- E _____ 25. I like design work best when I can do it easily.
- I _____ 26. Sometimes, when I'm doing creative work, I lose track of time.
- E _____ 27. I really enjoy doing better at graphic design than other students.
- E _____ 28. If I didn't have to do design projects, I wouldn't do it.
- E _____ 29. I hope that someday I'll be famous for doing graphic design.
- I _____ 30. I discover new things about myself when I do design work.
- E _____ 31. I really want to get rewards for doing good in graphic design.
- I _____ 32. Designing and being creative is important to me.

CHAPTER 4: ANNEXURE H

Petty's (1997:155) questionnaire to determine the level of approval centeredness in creative students

TABLE 1: When you look at your own creative work in progress are you focused on:	1	2	3	4
Whether it will impress trusted friends				
How it compares with the work of others				
Whether you can 'get away with' this or that.				
Whether it is acceptable to a teacher				
Protecting yourself from potential criticism by playing safe				
Whether it is fashionable or conforming to other widely accepted standards				
SCORE				
TABLE 2: OR are you focused on:				
Whether it achieves what you set out to achieve				
Whether it can better achieve this goal or purpose.				
How it compares with your previous work				
Learning from its weaknesses and strengths?				
Expressing your own individualism, even if it may be criticized?				
Whether the work satisfies your own standards of excellence?				
SCORE				

SCORE: Score up to plus two for each item in Table 1 and up to minus four points for each item in Table 2. An overall positive score is a measure of an individual's approval centeredness.

CHAPTER 6: ANNEXURE I

Relaxation techniques devised by Mc Kim (1992:265-267) that aim to reduce the types of cognitive and muscular stress that is associated with creative activities

TECHNIQUE 1: Stretching

Purpose: General preparation before mental and visual activity or to reduce anxiety while working on creative assignments.

Step 1: Close your eyes and sit quietly for a several minutes. Systematically explore the muscle sensations of your body: your face muscles, neck muscles, shoulders, neck muscles. Determine muscle areas that may be excessively tense (such as forehead, jawbone).

Step 2: Stand up and stretch – slowly and gracefully (like a cat). While stretching, inhale deeply.

Step 3: Exhale, sit down and relax. Sustain the passive sensation for several minutes.

TECHNIQUE 2: Relaxing neck and shoulders

Purpose: After prolonged periods of working at a desk, table or on computer on a design, particularly at times when working is accompanied by anxiety.

Step 1: Very slowly, bend your head forward three times, backwards three times and to each side three times.

Step 2: Then slowly and gently circle your head through the same movements, clockwise and then reverse, three times each.

Step 3: Pull your shoulders as far forward as you can, then as far up, as far back and as far down as you can. Repeat three times.

Step 4: With the fingers of both hands, massage the nape of your neck (near the back of the skull). This can be done by someone else as well.

Step 5: Breath in and out deeply, consciously letting go of excess neck and shoulder tension.

TECHNIQUE 3: Relaxing arms and hands

Purpose: Before starting to draw or paint or after prolonged periods of drawing, painting or designing.

Step 1: Sit or stand erect. Let your arms and hands hang loosely at your sides.

Step 2: As loosely as possible, shake your right hand. Extend this action to your forearm and then your entire arm.

Step 3: Let your arm rise over your head shaking the entire limb loosely and vigorously.

Step 4: Stop and let your right arm hang at your side. Compare the feeling in your right arm with the left arm. Repeat with your left arm.

Annexure I continues on the next page

(ANNEXURE I CONTINUED)

TECHNIQUE 4: Eye relaxation: palming

Purpose: To relax eyes at any time during the day and particularly after working on a computer or on an intricate illustration/design for a period.

Step 1: Precede the relaxation exercise by gently massaging your temples and the nape of your neck. Blink your eyes several times to lubricate your eyes.

Step 2: Close your eyes, covering them with the palms of your hands in the following way: rest the lower part of the palms upon your cheekbones and your fingers upon your forehead. Put your elbows on a desk, or on your knees, so that you can hold your head comfortably on your palms for several minutes.

Step 3: If your eyes are relaxed when you do this exercise, your sense-field should be filled uniformly with blackness. If you see any imagery at all, your eye muscles are not relaxed. In such instance, imagine a pleasurable scene involving black such as a furry black cat resting on a black velvet pillow. Repeat the exercise until your inner field of vision takes on a deep, rich blackness that characterizes complete eye relaxation.

Step 4: This last step is based on increased tension that are relaxed. Shut eyes tightly for a few seconds and let go.

Note: Since these techniques are aimed at the achievement of relaxed mental states, each of them could be concluded by a positive affirmation. Positive affirmations are most effective when they are verbalized in a relaxed condition.

CHAPTER 7: ANNEXURE J – PART 1

The Random Association technique: Clegg and Birch's (1999:116-118) compilation of random words to be used for execution of the technique

List 1: Random words

- | | |
|------------------|----------------|
| 1 Cat | 31 Teeth |
| 2 Gold bar | 32 Breakfast |
| 3 Desk | 33 Map |
| 4 Stopwatch | 34 Glue |
| 5 Fire | 35 Bark |
| 6 Forest glade | 36 Bikini |
| 7 City | 37 Scar |
| 8 Autumn | 38 Bed |
| 9 Doll's house | 39 Box |
| 10 Dragon | 40 Music |
| 11 Magic carpet | 41 Wallpaper |
| 12 War | 42 Missing |
| 13 Peace | 43 Photograph |
| 14 Scales | 44 Wind chimes |
| 15 Cigar | 45 Hole |
| 16 Hat | 46 Share |
| 17 Chewing gum | 47 Telephone |
| 18 Spittoon | 48 Cartoon |
| 19 Rainbow | 49 Baby |
| 20 Dolphin | 50 Sunset |
| 21 Fence | 51 Telescope |
| 22 Pain | 52 Silence |
| 23 Button | 53 School |
| 24 Mirror | 54 T-Shirt |
| 25 Compact disc | 55 Freedom |
| 26 Air freshener | 56 Road |
| 27 Happiness | 57 Sea |
| 28 Flower | 58 Sweat |
| 29 Christmas | 59 Monk |
| 30 Swan | 60 Shelf |

List 2: Adjectives

- | | |
|-------------|-----------------|
| 1 Pink | 31 Salty |
| 2 Purple | 32 Acidic |
| 3 Red | 33 Electrifying |
| 4 Green | 34 Thrusting |
| 5 Yellow | 35 Sexy |
| 6 Blue | 36 Lustrous |
| 7 Brown | 37 Shiny |
| 8 Orange | 38 See-through |
| 9 Turquoise | 39 Loud |
| 10 Black | 40 Quiet |
| 11 White | 41 Harmonious |

Annexure J continues on the next page

(ANNEXURE J PART 1 - CONTINUED)

12 Fluffy
13 Furry
14 Hard
15 Scratchy
16 Bubbly
17 Explosive
18 Sharp
19 Smooth
20 Oily
21 Slimy
22 Hot
23 Cold
24 Icy
25 Limp
26 Pungent
27 Rancid
28 Delicious
29 Sweet
30 Sour

42 Squeaky
43 Bulging
44 Wooden
45 Plastic
46 Metallic
47 Flexible
48 Rigid
49 Patient
50 Caring
51 Nosy
52 Greedy
53 Motherly
54 Angry
55 Happy
56 Naughty
57 Enormous
58 Tiny
59 Fat
60 Thin

CHAPTER 7: ANNEXURE J – PART 2

Example of how the Random Association technique could be used to generate ideas for a graphic design problem

Problem statement: *Generate a creative concept / name for a new two-seater taxi service in town that could be used for advertising purposes.*

RANDOM WORD	CREATIVE IDEA
Bird	→ 'FLY-BY' TAXI'S
Effervescent	→ 'ZESTI' TAXI
Telephone	→ 'LIFT-LINE'
Magic carpet	→ 'MAGIC CARPET RIDE'
Digital	→ '1-2-3 TAXI'
Watch	→ 'TIC-TOC TAXI'
Magic	→ 'SPARKY'
Pick	→ 'PICK and DROP'
Bee	→ 'SPEEDY BEE'
Circle >round	→ 'AROUND TOWN' TAXI'S or 'WHEELS AROUND'
Goose	→ 'GOOSE BUMPERS'
Difficult >easy	→ 'EASY WHEELS'
Road >Street	→ 'STREET-WISE TAXI'
Credit	→ 'CREDIT CAR'

CHAPTER 7: ANNEXURE K

The Synectic trigger mechanisms with suggestions for application as they appear on the *Creativity Web* (Cave, 1999)

<p>TRANSFER</p> <p>Move subject into a new situation Adapt, transpose, relocate, dislocate Adapt subject to a different frame of reference Move subject out of its normal environment Transpose to a different historical, social, geographical setting Adapt a bird wing model to design a bridge How subject can be converted, translated, transfigured?</p>	<p>EMPATHIZE</p> <p>Sympathize with subject Put yourself in its shoes What if subject has human qualities? Relate to subject emotionally, subjectively</p>
<p>SUBTRACT</p> <p>Remove certain parts or elements Compress or make it smaller What can be reduced or disposed of? What rules can you break? How to simplify? How to abstract, stylize or abbreviate?</p>	<p>ADD</p> <p>Extend or expand Develop your reference subject Augment, advance or annex it Magnify, make it bigger What else can be added to your idea, image, object, material?</p>
<p>ANIMATE</p> <p>Mobilize the visual and psychological tensions Control the pictorial movements and forces Apply factors of repetition and progression What human qualities subject has?</p>	<p>SUPERIMPOSE</p> <p>Overlap, place over, cover, overlay Superimpose dissimilar images or ideas Overlay elements to produce new images, ideas, meanings Superimpose elements from different perspectives, disciplines, time Combine sensory perceptions such as sound and color Superimpose several views to show different moments in time</p>
<p>CHANGE SCALE</p> <p>Make subject bigger or smaller Change time scale - seconds, minutes, hours, days, weeks, months, years Change proportion, relative size, ratios, dimensions</p>	<p>SUBSTITUTE</p> <p>Exchange, switch or replace What other idea, image, or material can you substitute? What alternate or supplementary plan can be employed?</p>
<p>FANTASIZE</p> <p>Fantasize your subject Trigger surreal, preposterous, outlandish, bizarre thoughts Topple mental and sensory expectations How far out can you extend your imagination? What if automobiles were made of bricks? What if alligators played pool? What if insects grew larger than humans? What if night and day occurred simultaneously?</p>	<p>ISOLATE</p> <p>Separate, set apart, crop, detach Take only part of your subject "Crop" your ideas with a "mental" viewfinder What element can you detach or focus on?</p>

Annexure K continues on the next page

(ANNEXURE K CONTINUED)

<p>DISTORT</p> <p>Twist subject out of its true shape, proportion or meaning Make imagined or actual distortions Misshape it, yet produce unique metaphoric/aesthetic quality Make it longer, wider, fatter, narrower Melt, crush, bury, crack, tear, torture, spill something on it</p>	<p>DISGUISE</p> <p>Camouflage, conceal, deceive, encrypt Hide, mask, "implant" subject into another frame of reference Conceal by mimicry, like chameleons and moths Create a latent image that communicate subconsciously</p>
<p>CONTRADICT</p> <p>Contradict the subject's original function Contradict visually and intellectually, yet remain structurally integrated Contradict laws of nature such as gravity, time, human functions Contradict normal procedures, social conventions, rituals Contradict optical and perceptual harmony (e.g. illusions). Deny, reverse</p>	<p>PARODY</p> <p>Ridicule, mimic, mock, burlesque or caricature Make fun of your subject, roast it Transform it into a joke, limerick or pun Make zany, ludicrous or comic references Make a humorous cartoon drawing of the problem</p>
<p>PREVARICATE</p> <p>Fictionalize, "bend" the truth, falsify, fantasize Use subject as a theme to present ersatz information Interpret information differently to mislead or confuse</p>	<p>ANALOGIZE</p> <p>Draw associations Seek similarities between things that are different Compare with elements from different domains, disciplines What can I compare my subject to? Make logical or illogical associations</p>
<p>HYBRIDIZE</p> <p>Cross-fertilize - wed subject with an improbable mate What would you get if you crossed a _with a _? Cross-fertilize color, form and structure Cross-fertilize organic and inorganic elements Cross-fertilize ideas and perceptions</p>	<p>METAMORPHOSE</p> <p>Transform, convert, transmutate Depict your subject in a state of change Change color, configuration Make structural progressions Make aging (cocoon-to-butterfly) transformation Make "Jekyll and Hyde" transmutations</p>
<p>SYMBOLIZE</p> <p>A visual symbol stands for something other than what it is Design an icon for your idea How can your subject be imbued with symbolic qualities? Public symbols are cliché, well-known and understood Private symbols are cryptic, have special meaning to its originator Works of art are often integrations of both public and private symbols Turn your subject into a symbol (public or private)</p>	<p>MYTHOLOGIZE</p> <p>Build a myth around your subject Transform your subject into an iconic object</p> <hr/> <p>REPEAT</p> <p>Repeat a shape, color, form, image, or idea Reiterate, echo, restate or duplicate your reference subject in some way Control the factors of occurrence, repercussion, sequence and progression</p>
<p>COMBINE Bring things together. Connect, arrange, link, unify, mix, merge, rearrange</p>	<p>COMBINE (continue) Combine ideas, materials and techniques. Bring together dissimilar things to produce synergistic integrations / What else can you connect to your subject?</p>

CHAPTER 7: ANNEXURE L

Summary of the triggers in the proposed Idea Checklist technique that may be used to facilitate the technique in graphic design education

SUBSTITUTE

- Formal elements such as colors, shapes, images, lines, material.
- Conceptual elements such as people, environments, time, objects and places.
- Use the 'Six Universal Questions' - who, what, where, when, why, and what - as prompts for substitution.

COMBINE

- Combine parts, elements, ideas, concepts or purposes, approaches.
- Connect, link, unify, mix and merge.
- Combine dissimilar concepts or previously unrelated subjects.
- Take concept apart and recombine.

ADOPT

- Investigate examples of other successful approaches.
- Adopt other styles and visual or conceptual solutions to problems.

MINIFY

- Minify elements, objects or visual imagery.
- Make it smaller, shorter, lighter, less frequent, more compact, more condensed or understated.

MAGNIFY

- Make it bigger, stronger, longer, thicker, higher, more extensive, more exaggerated or more frequent.
- Change proportion, relative size, ratios and dimensions.
- Overstate aspects or to take them to a dramatic extreme.

PUT TO OTHER USES

- Find unconventional uses for it by placing it where it is not usually placed.
- Change the context in which it is used.
- Play the Random Association technique to discover new uses.

ELIMINATE

- Trim down, subtract, omit, abstract, abbreviate or stylise colors, shapes, lines, images or forms.
- Examine whether all parts and elements of a design or concept are necessary.
- Narrow down a concept or advertising message to its essence.

(ANNEXURE L CONTINUED)

REVERSE

- Reverse existing concepts, patterns or elements to discover radically new approaches or perspectives.
- Transpose positive and negative, consider opposites or experiment with turning elements upside down or backwards.

ANIMATE

- Mobilize static elements: use repetition or progression.
- Consider which human (or movable) qualities a subject has.

SUPERIMPOSE

- Obscure and crop elements and images by means of overlapping.
- Play with overlapping or covering elements and images.

FRAGMENTIZE

- Separate, divide, split, dissect, take the subject or idea apart, chop it up or disassemble it.
- Use visual devices such as grids or patterns to accommodate smaller elements.

ISOLATE

- Separate (isolate) elements of a concept or a design to either place greater focus on it or suggest a new conceptual meaning to it.
- Isolation of visual objects and shapes could be done by means of compositional layout or by means of line and color divisions.
- Experiment with isolation through the use of a viewfinder (a small square window cut out of paper) to crop certain aspects of a design.

DISTORT

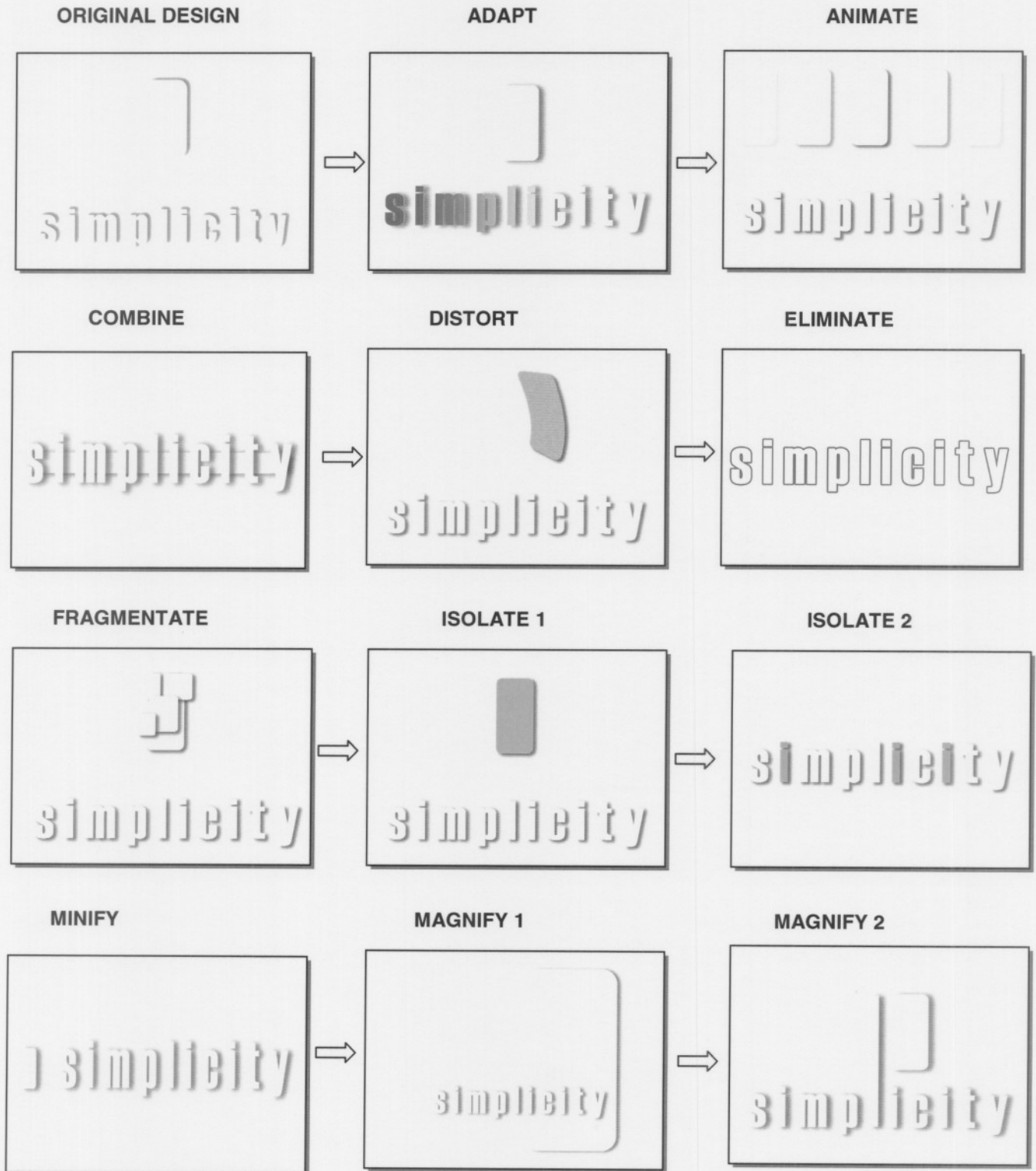
- Elements could be twisted, melted, crushed, buried, cracked, cut or made longer, wider, fatter and narrower.
- Transform the meaning and appearance of existing concepts through distortion.

REPEAT

- Repeat or multiply elements such as colors, shapes or textures.
- Make use of sequence, progression or the subtle echoing of shapes and colors.

CHAPTER 7: ANNEXURE M

Example of how the Idea Checklist technique could be used to facilitate the conceptualization of various creative solutions for an existing concept



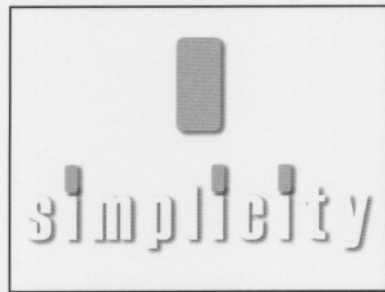
Annexure M continues on the next page

(ANNEXURE M CONTINUED)

MAGNIFY 3



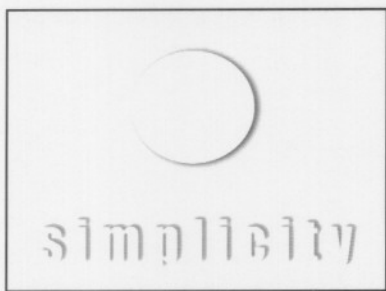
REPEAT



REVERSE



SUBSTITUTE 1



SUBSTITUTE 2



SUBSTITUTE 3



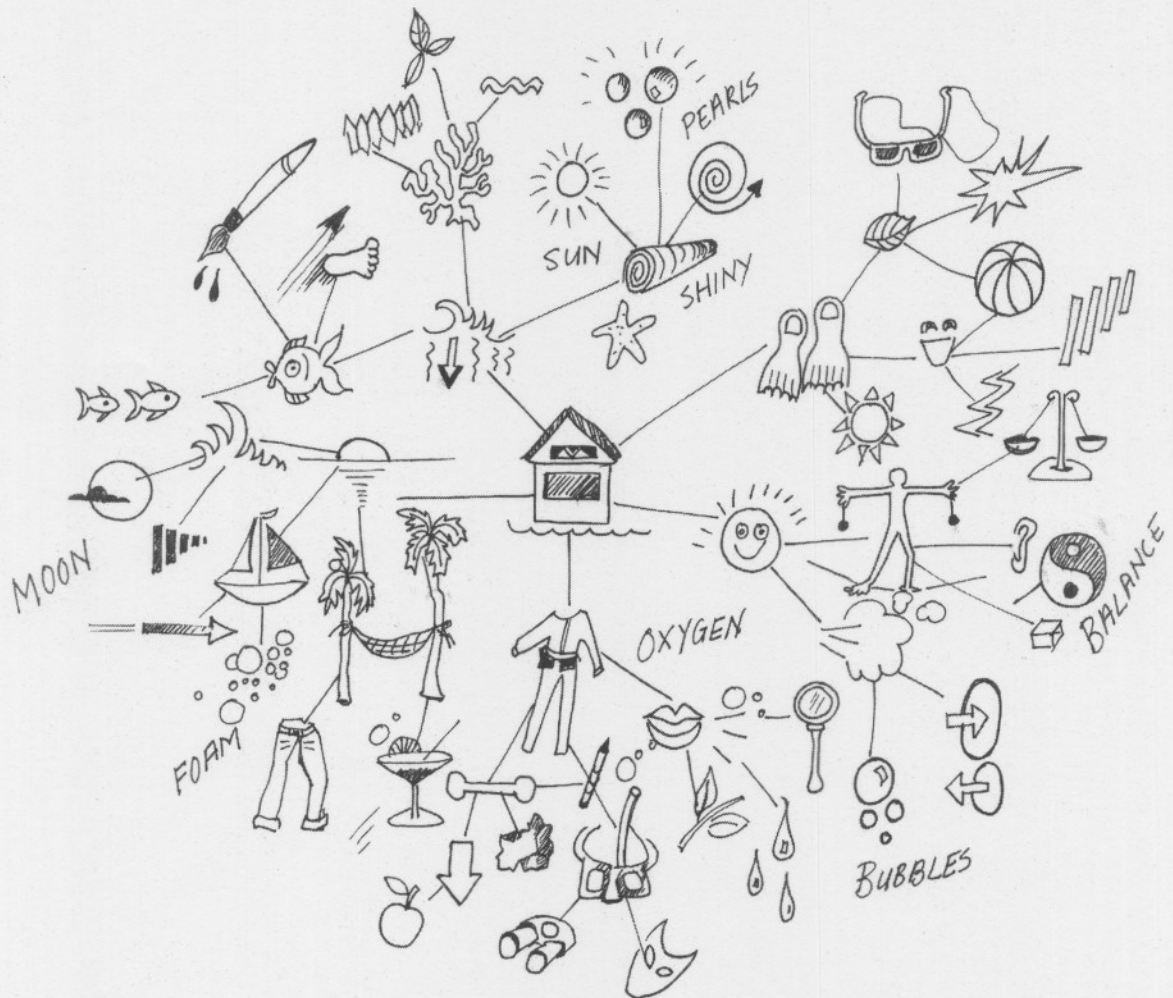
SUBSTITUTE 4



CHAPTER 7: ANNEXURE N

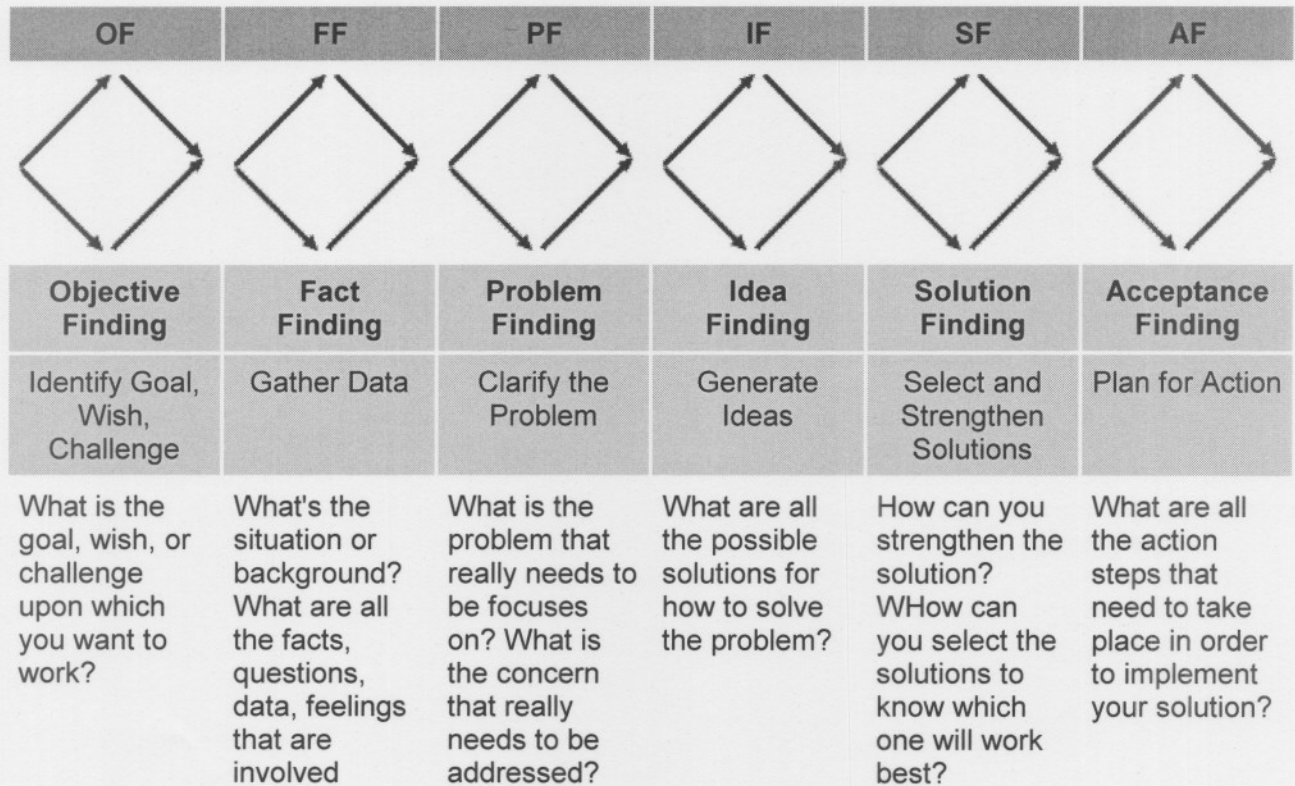
Example of how the Visual Thinking technique has been applied to the mind-map in Figure 8 (Chapter 7) to generate ideas for the following problem statement:

Conceptualize an idea for an advertising campaign which includes a name, a logo and a slogan for a sea-side company who offers scuba diving courses, facilitates diving excursions and sells diving equipment.



CHAPTER 8: ANNEXURE O

The *Osborn-Parnes model for creative problem-solving* (Cave, 1999).



Suggestions for activities at the various stages:

OBJECTIVE FINDING - Use this checklist of questions to prod your thinking:

- What would you like to get out of life?
- What are your goals, as yet unfilled?
- What would you like to accomplish, to achieve?
- What would you like to have?
- What would you like to do?
- What would you like to do better?
- What would you like to happen?
- In what ways are you inefficient?
- What would you like to organize in a better way?
- What ideas would you like to get going?
- What relationship would you like to improve?
- What would you like to get others to do?
- What takes too long?
- What barriers or bottlenecks exist?
- What do you wish you had more time for?
- What do you wish you had more money for?
- What makes you angry, tense or anxious?
- What do you complain about?

Annexure O continues on the next page

(ANNEXURE O CONTINUED)

FACT FINDING - Use Who, What, When, Where, Why and How questions

- Who is or should be involved?
- What is or is not happening?
- When does this or should this happen?
- Where does or doesn't this occur?
- Why does it or doesn't it happen?
- How does it or doesn't it occur?
- ...and so on

PROBLEM FINDING - Listing alternative definitions of the problem

One principle of creative problem solving is that the definition of a problem will determine the nature of the solutions. In this step it helps to begin each statement with "In what ways might we (or I)...." (IWWWW).

- What is the real problem?
- What is the main objective?
- What do you really want to accomplish?
- Why do I want to do this?

IDEA FINDING - The divergent-thinking, brainstorming stage

This is where a variety of idea-generation ("creativity") techniques can be used. Ideas are freely proposed without criticism or evaluation, for each of the problem definitions accepted in the second stage.

SOLUTION FINDING - Three related steps:

1. Criteria for evaluation listed
2. The ideas are evaluated (evaluation matrix is useful)
3. One or more of the best ideas are selected

Criteria might include:

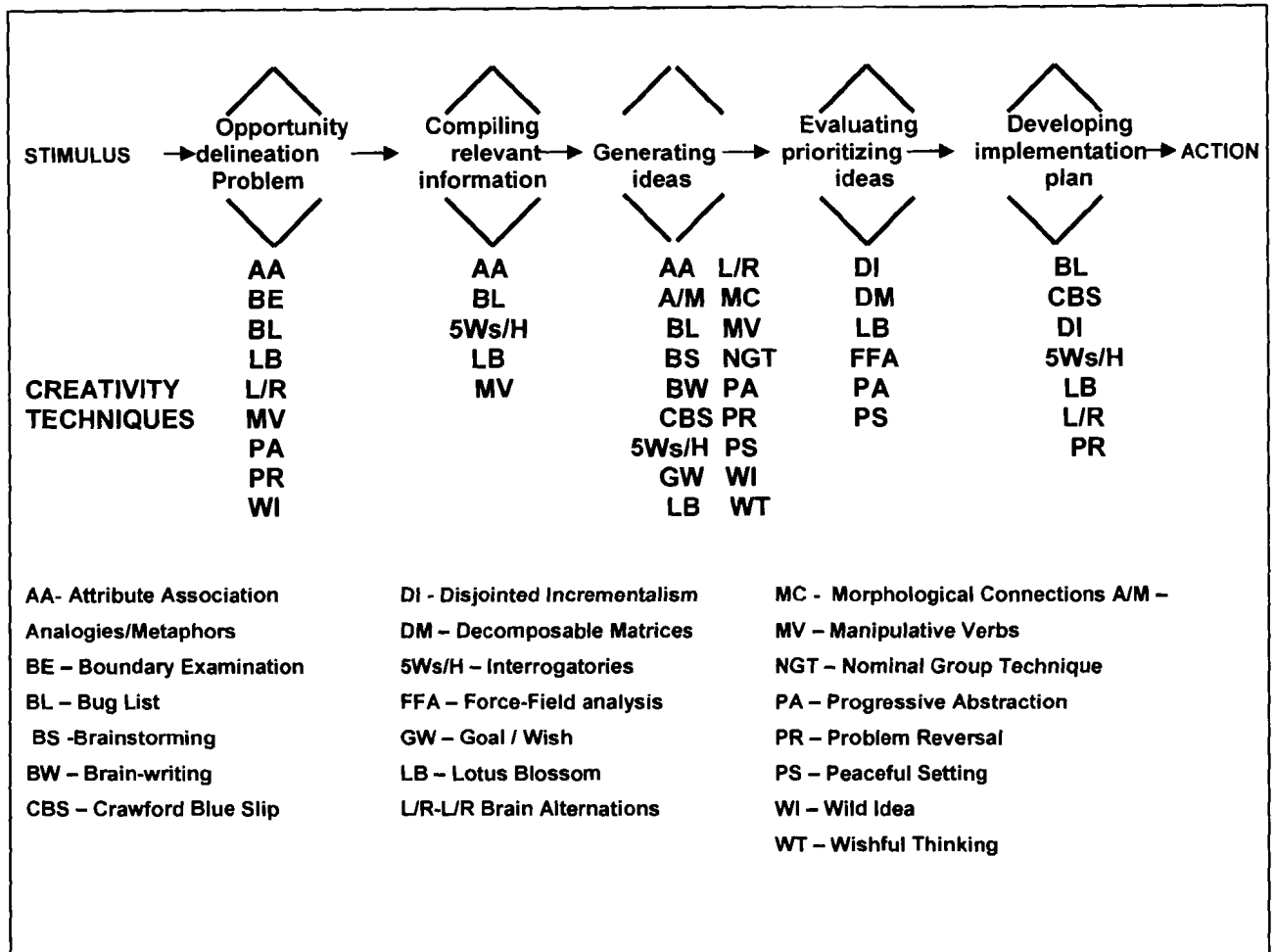
- Will it work?
- Is it legal?
- Are the materials and technology available?
- Are the costs acceptable?
- Will the public accept it?
- Will higher-level administrators accept it?

ACCEPTANCE FINDING - ways to get the ideas into action

This may involve creating an action plan, which is a plan containing specific steps to be taken and a timetable for taking them.

CHAPTER 8: ANNEXURE P

The Couger (1995:119) variant of the *Osborn-Parnes model for creative problem-solving*, showing five steps of the creative process with a range of creativity techniques which could be used to achieve the various aims of each phase.



CHAPTER 8: ANNEXURE R

Sample questions for the Six Universal Questions technique developed by Treffinger *et al.* (2000:31).

- **Who?**

Who's involved?
Who has created or added to the situation?
Who will have to help deal with it?
Who's concerned about the task, or excited about it?

- **Where?**

Where does the action take place?
Where else has anyone dealt with a similar situation?
Where are the best or worst places to be?
Where would we like to be with this task in the near future?

- **What?**

What has been done before?
What resources do we have or need?
What would we like to see happen?
What if we had a magic wand?

- **Why?**

Why do we have this situation?
Why hasn't it been dealt with?
What's holding us back?
Why do we really want to deal with it?
Why might anyone not want to deal with this situation?

- **When?**

When did I become aware of this?
When do I think most about it?
When must action be taken?
When is the best or worst time to work on it?

- **How?**

How do I see this situation?
How do others view it?
How would we like to see changes made?
How would our ideal be different from the present?
How have other efforts succeeded or failed?

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