AN INVESTIGATION INTO THE RELATIONSHIPS BETWEEN CREATIVITY, PROBLEM SOLVING AND LIFE STRESS: A FOCUS ON MALAYSIAN UNIVERSITY STUDENTS

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by

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KAJIAN TERHADAP HUBUNGAN DI ANTARA KREATIVITI, PENYELESAIAN MASALAH DAN TEKANAN HIDUP: SATU FOKUS KEPADA PELAJAR UNIVERSITI DI MALAYSIA

ABSTRAK

Walaupun konsep kreativiti, penyelesaian masalah dan tekanan hidup telah banyak dikaji secara berasingan, bilangan kajian yang melihat kaitan antara ketiga perkara ini masih lagi terhad. Untuk mengisi kekurangan kajian dalam isu ini, dua siri penyelidikan telah dijalankan untuk meneliti hubungankait antara kreativiti, kebolehan menyelesaikan masalah dan tekanan hidup. Dalam kajian pertama, seramai 246 responden dari Universiti Sains Malaysia (USM) telah dipilih untuk menjawab satu set soalan selidik. Soalan soal selidik terbahagi kepada isu latar belakang responden, daya usaha dalam kreativiti, kebolehan menyelesaikan masalah dan persepsi tentang tekanan hidup. Dapatan kajian menunjukkan kreativiti berkorelasi positif dengan keupayaan menyelesaikan masalah (r = .409, p < .01) sebaliknya keupayaan menyelesaikan masalah menunjukkan korelasi negatif dengan tekanan hidup (r = -.266, p < .01). Di samping itu, terdapat juga korelasi positif antara kreativiti dengan kekerapan tekanan (r = .142, p < .05). Faktor latar belakang seperti umur, kaum dan agama turut mempunyai pengaruh. Pelajar yang lebih muda dan berbangsa Melayu menunjukkan kebarangkalian lebih tinggi untuk melaporkan

tekanan hidup. Dalam kajian kedua, seramai 30 responden dari universiti yang sama telah dipilih untuk menjawab beberapa soalan terbuka bagi menguji tahap kreativiti dan keupayaan menyelesaikan masalah. Responden juga perlu menjawab satu set soalan yang berkaitan dengan tekanan dalam hidup. Seperti dalam kajian pertama, kreativiti mempunyai hubungan positif dengan keupayaan menyelesaikan masalah ($r = .638$, $p < .01$) sementara tahap tekanan turut membawa hubungan positif dengan kekerapan tekanan ($r = .627$, $p < .01$). Walaubagaimanapun, hubungan antara kreativiti, keupayaan menyelesaikan masalah, tekanan hidup dengan latar belakang adalah tidak sama dengan keputusan dalam kajian pertama. Dapatan daripada kedua-dua kajian menunjukkan kepentingan kreativiti dan kebolehan menyelesaikan masalah sebagai agen untuk mengurangkan risiko tekanan hidup, terutamanya untuk pelajar universiti.

AN INVESTIGATION INTO THE RELATIONSHIPS BETWEEN CREATIVITY, PROBLEM SOLVING AND LIFE STRESS: A FOCUS ON MALAYSIAN UNIVERSITY STUDENTS

ABSTRACT

Even though creativity, problem solving and life stress have been studied widely as separate entities, there have been a limited number of studies that focus on the influence of creativity on problem solving and life stress. To fill up this gap, two studies were conducted to investigate the relationships between creativity, problem-solving ability and life stress. In Study 1, 246 students from Universiti Sains Malaysia answered a set of questionnaire which comprised of sections on background information; self-assessment of creativity and problem-solving ability and perceptions of life stress. The results show that creativity had a significant positive relationship with problem-solving ability (r = .409, p < .01) while problem-solving ability had a significant negative relationship with life stress (r = -.266, p < .01). Moreover, there was a significant relationship between creativity and frequency of stress (r = .142, p < .05). In addition, significant relationships also emerged between life stress and background variables such as age, ethnicity and religion. Students who were younger in age and Malays were more likely to report a higher level of stress. In Study 2, 30 students from the same university answered

several open-ended questions to test their level of creativity and problem-solving ability. They also completed a set of questionnaire on perception of life stress. Consistent with findings from Study 1, creativity had a significant positive relationship with problem-solving ability (r = .638, p < .01) while level of stress had a significant positive relationship with frequency of stress (r = .627, p < .01). However, significant relationships between the core variables (creativity, problem-solving ability and life stress) and background variables were not consistent with the relationships in Study 1. Nevertheless, findings from both studies suggest the importance of creativity skills and problem-solving ability as preventions against life stress, particularly for university students.

Keywords: creativity, problem solving, life stress, university students

Chapter 1

Introduction

1.1 Introduction

Many scholars have studied creativity. In general, it can be defined as an ability to generate a new thing or to be unique and different from ordinary, conventional people. The concept creativity has been associated with better academic performance (Ai, 1999; Altman, 1999) and better well-being (Collins, 2006). For instance, Collins (2006) found in her study that vocational creativity may induce a higher level of life satisfaction for older adults.

Problem solving has also been recognized as an important ability that can help a person to cope with his or her daily lives. Broadly defined as an ability to handle obstacles effectively, it can be viewed as one of the necessary factors in increasing the competitiveness of a person (Green, 2007).

Psychologists have also studied stress rather extensively. Many agreed that stress can have negative impacts on the well-being of a person. Holmlund-Rytkonen and Strandvik (2005) defined stress as the state of intense strain and pressure to which an individual fails to make a satisfactory adaptation. Based on this view, stress

can potentially lead to a negative outcome and eventually impact a person's health and well-being.

While the three variables (creativity, problem solving and stress) have been seen as important and have separately been studied rather extensively, it is interesting to note that not many researchers focus on studying them together. Currently, researches on these three variables tend to be rather separated. Yet, it is likely that a creative person may have a better problem solving ability and therefore can cope with stressful situations better. As such, it is important for scholars to really examine the relationship between these variables. The studies described in this thesis attempted to contribute to this body of research by investigating the relationship between creativity, problem solving and stress.

1.2 Problem Statement

A huge number of studies have demonstrated stress as having harmful impact on human being. For example, Taylor (2006) viewed stress negatively and suggested that stress is a negative emotional experience. Stress is likely to lead to some biochemical, physiological, cognitive, and behavioral changes in a person. All of these changes can potentially bring negative impacts to a person's physical (Burg,

1992) and psychological health. At the same time, stress may lead to health impairing habits or behaviors, and may also cause illness behavior which influences the course of a disease (Sutherland & Cooper, 1990). For example, Kouvonen**,** Kivimäki**,** Virtanen**,** Pentti and Vahtera (2004) revealed that work stress is related to cigarette smoking, one of the risk factors of cancer and coronary heart disease.

The effect of stress to psychological health should not be underestimated. In fact, stress causes a lot of psychological problem according to many studies (e.g., Harvey, Harris, Harris and Wheeler, 2007). Verona and Kilmer's (2007) laboratory research, for example, has provided evidence for Berkowitz's model which hypothesized that stressful event of all kinds can prime the initiation of escape and attack behaviors. The same study also indicated that men who were exposed to high levels of stress also exhibited high levels of aggression. Pieterse and Carter (2007) revealed in their study that general life stress accounted for a greater variance in psychological health and has a stronger relationship with both psychological distress and well-being.

Specifically focusing on university students, Dusselier, Dunn, Wang, Shelley II and Whalen (2005) indicated that "excessive stress reduces work effectiveness, contributes to bad habits, and results in negative long-term consequences, including

addictions, crime, absenteeism, poor academic performance, school dropout, professional burnout and, ultimately career failure" (p.16). At the same time, the same study also revealed that students will experience physical and psychological impairments when they perceived stress negatively. Those results corresponded with the finding of American College Health Association which indicated that stress is the primary obstruction to academic performance. Furthermore, Dusselier et. al. (2005) also indicated that other than poor health, stressful life events also may influence the quality of life among college students. They argued that there is a connection between stress and disease. Moreover, because stress is a part of students' existence, stress can also impact how college students cope with the demands of college life. For example, Arthur (1998) indicated in her research that postsecondary students who were experiencing emotional distress and depression tend to use more disengagement coping compared to other students.

From above, it is clear that stress can be damaging to a person's physical and psychological health. A person who is not physically and psychologically fit may find achieving goals and success in life difficult. Within the context of university students, stress can lead to poor academic performance and lower rates of success. As a result, it is important to understand and learn ways on how to deal with stress. This

is especially important to help individuals minimize the threat of stress and consequently increase their chances to succeed in life.

Unfortunately, the existing approach to studying and dealing with stress tend to be rather passive. Many of the studies that focus on how to deal with stress tend to restrict themselves to only providing ways to cope and manage stress. This is particularly more effective in cases where stress already occured and a person is already experiencing some negative impact of stress. Yet it is likely to be more effective to tackle the problem even before it occurs. This is what can be termed as a more active way in dealing with stress. An active way means rather than waiting for it to happen, perhaps it is more effective to prevent the stress from happening or minimize the occurrence. It can be somewhat comparable to using antibody to avoid the occurrence of certain diseases. In the context of stress, it is likely that there are some forms of “antibodies” that can strengthen a person’s protection against it.

Within the context of this study, two factors have been recognized as having the potential to alter the occurrence of stress. These two factors are creativity and problem solving skills. Some studies have revealed that creativity and problem solving can potentially influence stress. For instance, in the study of the relationship

between stress and problem-solving ability, Fraser and Tucker (1997) contended that the stress levels of college students who are good at problem solving are lower than those who are poorer at problem solving. Meanwhile insufficient problem-solving efforts in the work domain may result in higher psychological distress (Thoits, 1994). This seems to suggest that stress could be decreased by problem-solving ability. In other words, improvement in problem-solving ability can lead to less stress in the future.

If problem-solving ability can decrease stress, is there anything that can improve problem-solving ability? Researches have found that one of the factors that could increase problem-solving ability is creativity. This result which indicates that creativity and problem solving are connected is supported by some studies. For example, Maier (1970) suggested that a creative person should also be a good problem solver. Some studies have manifested this notion by indicating that creativity and problem-solving ability are different abilities but highly correlated (Liu, 1995; Zhan, 1989). On the other hand, Guilford deemed that problem-solving ability is one of the abilities of creativity (cited in Ju, 2004). Wu (2006) also agreed on the relationship between creativity and problem solving by pointing out that the psychological state approach of creativity was proposed according to the five

problem solving processes by Dewey in 1910. As a result, it seems likely that the higher level of creativity may enhance the problem-solving ability, and this in turn will reduce the occurrence of stress. Hence, the studies on the relationship between both variables and stress will allow greater understanding of these constructs.

By focusing on a group of Malaysian university students, this study also contribute to a body of research that is currently rather limited. Many of the studies on stress, creativity and problem solving tend to focus on Western culture and Western samples. There are only a small number of studies that focused on Eastern cultures and Eastern respondents. This study provides greater and wider understanding of the three variables by examining the relationship between creativity, problem solving and stress in a group of Malaysian university students.

1.3 Significance of the Study

In general, this study contributes to theoretical understanding of the relationships between creativity, problem solving and stress, which is useful but has yet to receive much attention from psychologists. One importance of this study is to enhance our understanding on how to cope with stress. It can provide a more preventive approach to stress by determining the relationships between creativity,

problem solving and stress. This more effective approach enables individual to reduce the occurrence of stress instead of putting effort to cope with stress only after it has happened. On the other hand, this study expands on the impact of creativity and problem solving into a new area. With this expansion, it may give a direction for other researchers to focus on how creativity and problem solving can enhance individuals' quality of life. Thus, theoretically speaking, this study can somewhat increase the understanding of the relationships between creativity, problem solving and stress. In addition, this study will also have practical implications. It can widen understanding on how to reduce the occurrence of stress.

In addition, this study also examines the level of creativity and problem solving of university students. This may provide understanding of how creative Malaysian university students are and how well they can cope with obstacles. This in turn can serve as a reference for the future studies on issues related to higher education. Furthermore, this study also identifies the level of stress and the stressors experienced most frequently by current university students. This not only provides understanding of stress in the Malaysian context, but also enables comparisons to be made with the existing results of studies on stress conducted in other cultures, particularly the West.

The significances of the present study are not only limited to education. The findings can also be applied to other samples or populations. Findings from this study may lead to similar studies to be conducted on other samples or populations such as employees of an organization. This can allow other populations to also benefit from a more active and possibly effective approach in dealing with stress. Low levels of stress may lead to higher levels of productivity.

1.4 Research Objectives

1. To identify the relationship between creativity and problem-solving ability among Malaysia university students
2. To identify the relationship between problem-solving ability and stress among Malaysia university students
3. To identify the relationship between creativity and stress among Malaysia university students

1.5 Research Questions

1. What is the relationship between creativity and problem-solving ability?
2. What is the relationship between problem-solving ability and life stress?
3. What is the relationship between creativity and life stress?
4. What is the relationship between creativity, problem solving and life stress?

1.6 Limitations of the Current Study

In this study, there are some limitations. Due to time and financial constraints, the study can only focus on students from Universiti Sains Malaysia (USM). Therefore the respondents may not be truly representative of the whole population of Malaysian university students. However, since the university chosen is one the largest universities in Malaysia, it can be concluded that the sample is rather acceptable.

Secondly, the research only discovers the associations between creativity, problem solving, and stress, but not the causal relationships. Hence, the question of whether creativity or problem-solving ability is the cause of the change in stress levels is not answered. However, within the context of this research, the association

between the variables can somehow shed some lights on possible theoretical relationships between the variables.

The third limitation may come from the instruments used. While there is an attempt to come up with the best possible instrument, there may still be some issues regarding the selection of the instruments. There may be better alternatives available. However, given the analysis of the reliability, the instruments used are still acceptable.

Fourth, there may be some problems with the sampling. Due to time constraint, it is not practical to completely do a random selection for both Study 1 and Study 2. Also, some of the ethnic and religious groups are very small compared to others. As such, certain ethnic, religious and sex groups may be under-represented. To overcome this issue, the results must be interpreted with caution. This issue will be addressed more thoroughly in a later section.

1.7 Arrangement of the Thesis

Chapter 2 focuses on the literature review and the definitions of each variable in this study. The current theories of creativity, problem solving and stress are discussed

in this chapter. The chapter will begin with the discussion of creativity and the relevant theories. The definitions of problem solving and the relevant terms are discussed in the following sections. In the last section of this chapter, the three major models of stress and findings of university students' life stress are discussed. Chapter 3 discusses the research design and methodology of the present study. The two sections discuss the methodology, including participants, procedures and instruments used in the two studies respectively.

Chapter 4 deals with the analyses of the data. It is divided into two major sections, analyses for study 1 and study 2. Each section starts with the examination of the participants' demographic background and then followed by the analyses of instruments. After that, ANOVA, Pearson-correlations and multiple regressions are presented to illustrate the relationships between variables.

Chapter 5 is the last chapter which discusses the results of the present study. In this chapter, implications of the results are also discussed. At the end of this chapter, suggestions for future studies are given. This is followed by a conclusion.

Chapter Two

Literature Review

2.0 Introduction

The main purpose of the present study is to investigate the relationships between creativity, problem solving and life stress. In this chapter, the definitions and theories involving these three relevant variables are discussed. Brief introduction, research framework and hypotheses of the present study are also discussed at the end of this chapter.

2.1 A Focus on Creativity

This section focuses on creativity. The historical background, definition and current theories regarding creativity will be discussed in the next part. The section will end with a discussion on the concept of creativity as used in this study.

2.1.1 Historical Background of the Concept

According to Lai (2006), the study of creativity went back as far as the 19th century. One of the earliest articles on creativity was written by a British psychologist, Golton (Chou, 2004). This article drew a lot of attention from

psychologists and kind of promoted the study on creativity. The development of studies on creativity can actually be divided into 3 stages. In the beginning, the studies of creativity mainly focused on the development of the theory without any empirical studies. Not until 1908, the beginning of stage 2, the direction of studies changed to discover the personality of a creative person. However, the research interest in creativity again changed in the third stage. In this stage, the focus was on identifying the cognitive structure related to creativity (see Table 2.1).

Table 2.1 Development Stages of Creativity. Source: Lai (2006)

Stages	Era	Progress
First stage	1896~1907	The studies of creativity were all limited to theory but not experiment.
Second stage	1908~1930	The studies focused on the analysis and research on the personality of a creative person.
Third stage	1931~1949	The direction of creativity's research changed from psychoanalysis to cognitive. The study on cognitive structure and the thinking method of creativity begun in this stage.

In 1950, Guilford talked about creativity as the topic of his speech at the inaugural ceremony of the American Psychological Association. He recommended the positive importance of creativity and called upon scholars to put creativity into their research agendas. As a result, the psychological field began to pay attention to creativity and hence carried out a large amount of research on creativity (Tu, 2005). The studies on creativity started from Guilford's presidential address to his

contemporaries can also be divided into three waves. Feldman and Benjamin (2006) labeled them as 1) technological innovation; 2) rebellious, unconventional ideas; and 3) recognized work of major significance. These waves provided the basis for current multiple approaches in studying creativity. Those multiple approaches will be discussed further in the coming sections.

2.1.2 Definitions of Creativity

Even though a large number of studies have been done in the past, the scholarly field still fails to offer a definition of creativity which can be accepted by everyone. Part of the reason may be due to the complexity of creativity itself. However, the other reason contributing to the lack of agreement about the definition of creativity may be due to how different researchers propose different concepts of creativity. For example, in the early development of the research on creativity, Guilford defined creativity as a kind of ability's performance. He suggested that creativity includes factors such as "susceptibility to the question", "fluency", "innovative ability", "flexibility", "integration ability", "recombine ability", "complexity" and "appraisal ability" (Chou, 2004). In 1968 Guilford revised them into 4 abilities:

(1) Fluency : Ability to output a large number of new ideas

(2) Flexibility : Thinking ability to break through the limit by thinking the question from different angles

(3) Originality : Ability to produce novel ideas

(4) Elaboration : Ability to improve the existing idea

On the other hand, the perspective of ability's performance regarded creativity as the ability of creative thinking, imagining strength, invent ability, divergent thinking (Chen, 2002), and problem solving ability (Mao, Kuo, Chen & Lin, 2000). Cates (1979) indicated that creativity is a thinking ability which is elastic and has the ability to break old ideas. Moreover, creativity has also been viewed as the ability to form a new relation by linking different information, irrelevant concepts or existing idea and products (Guilford, 1985; Taylor, 1959; Wiles, 1985). On the one hand, creativity was also considered as the ability to reassume the question, revise or retest the assumption in order to solve a problem (Torrance, 1962). Some scholars who support this idea indicated that creativity is dynamic, because it is not a personal talent but is a kind of skills that can be trained (Ambrose & Kulik, 1999). Basadur, Wakabayashi and Graen further indicated that personal creativity can be promoted by the change and the demand of the environment (cited in Li, 2004).

Besides the perspective of ability, there were other views of creativity. Robbins (2003) indicated that creativity is different from existing intention, and can offer the proper chance to solve or improve the problem; Albrecht (1987) defined creativity as a process to produce the novel, occasionally useful new idea; Amabile (1988) admitted that creativity produces novel and useful product, but she added that these products can be developed by individuals or a working group made up of individuals; Oldham and Cummings (1996) modified their view and defined creativity as novel or originally. Chen (2002) has summarized the definition of creativity as below:

Table 2.2: List of the Definitions of Creativity. Source: Chen (2002)

Scholar	Year	Definition
Mednick	1962	Creative thinking is a process of association.
Torrance	1966	Creative thinking procedure includes the perception of defect, explores the difficulty to look for the answer, propose assumption and then proves or revises it and finally transmits to other.
Guilford	1967	Creativity is the cognitive ability which can be deemed as a kind of divergent thinking and constitutes fluency, flexibility and originality.
Amabile	1983	Creativity is a novel, useful, correct or valuable response to present work. This work must be enlightened and does not follow the prescribed order or method to solve a problem.
Sternberg	1988	Creativity is the result of the interaction between generation process of intelligence, knowledge, the style of intelligence, personality, motive and environment.
Gardner	1988	Creativity is a synthetical development of biology, psychology, domain knowledge and social context
Kao	1991	Creativity is a coping procedure of mankind. It can cause novel, useful, duplicated and understood results.
Shalley	1995	Creativity means individuals can develop the novel and suitable solution for working problems.

From Table 2.2, creativity has been defined as cognitive ability, interaction between intelligence and environment and also a coping procedure. Table 2.2 also

illustrates that the definitions of creativity as used by various scholars can be different from one another. Each definition was proposed according to the scholars' own perspective. This incongruence has made the study of creativity becomes more difficult. In order to overcome this problem, some scholars have started to find a commonly agreed point of view in studying creativity. Finally, many of the scholars working in the area of creativity agreed that major theories on creativity can be divided into two categories, single aspects and multiple aspects. Discussion on these two categories will be presented in the next section.

2.1.3 Theories of Creativity

As mentioned earlier, major theoretical perspectives on creativity can generally be divided into two categories: single aspects and multiple aspects. Within the perspective of the single aspect, only one construct will be considered at a time. The four main aspects are person, process, product and place (Rhodes, 1961). This major theoretical perspective on creativity can sometimes be called as 4P theory (Rhodes, 1961). On the other hand, the multiple aspects advocates argued that it is more appropriate to study creativity by using the interactional approach. In the interactional approach, two or more aspects will be considered at the same time to

allow for a more comprehensive study of creativity. In the next section, discussions on these two approaches are presented.

(A) Single Aspects Theory of Creativity

(a) Focus on Person

Many researchers believe that there are some unique personalities possessed by the highly creative person. For example, Milgram and Hong indicated that creativity is not only a kind of ability. In fact, it also includes personality traits component (cited in Ju, 2004).

The aim of the scholars who hold this belief is to find out what kind of the personality traits may facilitate the growth of creativity. Some results have been revealed from the studies. Gardner (1993) said that a creative person uses his or her cognition in a more effective and elastic manner. Oldham and Cummings (1996) found that people who are easily attracted to the complexity of things, have extensive interest, sharp intuition, high aesthetic conceptions, and strong self-confidence and can highly tolerate ambiguous situations, usually score higher in creativity tests. Runco and Walberg (1998) summed up that a person with high creativity possesses the following traits: is highly motivated, loves to discover problems, loves

challenges, has adaptable cognition, has adaptable personality, and is highly independent. Moreover, Williams pointed out that creativity is a kind of performance of our personality traits. A creative person has certain traits such as highly curios, risky, loves challenges and imaginative (cited in Su, 2005).

(b) Focus on Process

This notion believes that creativity is a kind of psychological operation (Lai, 2006). It is important to find out the key elements and stages needed in creativity generation. According to Wallas (1926), creativity is an operation procedure of thinking. He further identified four steps in the creative process:

a. Preparation: The person acknowledges that a problem exists and attempts to interpret and solve it.

b. Incubation: After the failure of primary attempts to solve the problem, the person stops to work on it consciously but still continues to work on the solution unconsciously.

c. Illumination: The person gets a flash of insight that brings the solution to his conscious level of thought.

d. Verification: The confirmation of the insight by checking its validity.

(c) Focus on Product

The core notion of this product-based approach is to define creativity as the generation of creative idea, followed by the process of turning it into a more concrete idea. Eventually the construct idea will need to be turned into a product (Lai, 2006). Wu (2006) indicated that using product to evaluate creativity level of a person is the easiest method. Amabile (1983) also agreed with this notion. She defined creativity from the angle of product and emphasized that product or an observable reaction is the ultimate evidence of creativity. According to this point of view, Amabile (1996) divided creativity into conceptual and operational definitions. The former means an individual possesses creativity when he or she can produce a novel, proper, useful and valuable response when faced with a task that does not have a clear solution and goal. On the other hand, the operational definition means that whether or not a certain product or the response is creative depends on the evaluation made by an expert in the field.

Due to the convenience of this product-based evaluation method, some scholars applied this notion and developed their own criteria for their assessment. For example, Perkins argued that to be assessed as creative, the product should encompass originality and appropriateness (cited in Starko, 1995). Stein pointed out

that a creative product must be useful, stable, appropriate and better than an existing product (cited in Taylor, 1988). Amabile (1988) proposed that a creative product should be novel, suitable and useful. However, Amabile has also emphasized on the approval of the experts in recognizing the product as useful.

Even though the assessment criteria of each scholar were not exactly identical, there are some similarities between them. Most of the researchers agreed that to be assessed as creative, the product of a person should possess newness (novelty), originality, appropriateness, and usefulness (Ju, 2004; Mayer, 1999; Sternberg & Lubart, 1995; Su, 2005; Wu, 2006).

(d) Focus on Place/Press

This approach studies the interaction between person and environment. It tries to figure out the kinds of stressors in the environment that will induce creativity. Meanwhile, it also tries to estimate the kinds of environment that can facilitate the production of creativity (Lai, 2006). According to Mao (1989), the environment that can improve or support the generation of creativity is an environment that facilitates the personal motivation in creation, cultivates creative personality traits, allows creative psychological process and encourages creation (cited in Yeh, 2003).

Even though the single aspect perspective does simplify the study of creativity by focusing only on one aspect of creativity at a time, however, it has been criticized for not focusing on the overall and bigger picture. The advocates of multiple aspects approach (e.g. Sternberg & Lubart, 1999) argue that it is important to study not just one aspect but the interaction aspects. As a result, more and more studies are beginning to focus on more than one aspect.

(B) Multiple Aspects Theories of Creativity

The supporters of this notion indicate that the study on creativity will be more complete when more than one factor is taken into account. Therefore, by using the interactional approach to study creativity, the researchers regard creativity as a result of the interaction between the individual and environmental factors. The part below discusses three of the multiple aspects theories which are used in most of the study of creativity.

1. Componential Theory of Creativity

This theory was proposed by Amabile (1983) who found that existing studies on creativity neglected the influences of social and cultural factors. Therefore, Amabile applied the point of view of social psychology and the view

of product to study creativity (Ju, 2004). This theory is intended to illustrate how factors in working environment can influence creativity.

Amabile (1983) suggested that there are three components, domain-relevant skills, creativity-relevant skills and task motivation, needed in order to generate creativity. Domain-relevant skills are the basic skills of a specific field; creativity-relevant skills are the general skills that can be carried over from domain to domain; task motivation is the working attitude and perception of work of a person. These three components have different roles in the creativity generation. Domain-relevant skills can be viewed as the preparation stage for creation; creativity-relevant skills are responsible for the searching of feedback; task motivation will influence the person's learning and preparation in domain-relevant skills and creativity-relevant skills and also be responsible for the searching of task information during the creation processes. Amabile (1983) indicated that the level of interaction of these three components will influence our creativity level. In other words, to have a higher level of creativity, it is important to increase the interaction levels of these components.