Developing Students' Creativity

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Abstract: Creativity is important at both the individual and the societal levels. Creative accomplishments help to build a more interactive world that fortifies human civilization. Many researchers believe that components of creativity can be influenced by schools. In fact, teachers as change agents can stimulate the development of students' creative potential, and can also help them acquire skills and knowledge necessary to generate novel and useful ideas. This paper reviews writings in an attempt to clearly identify the factors that enhance students' creative thinking and hence that need to be taken into consideration when managing creativity in educational organizations. The literature review summarizes two key factors that affect students' creativity, namely organizational (effective leadership, culture) and individual factors (personality factors, motivation, knowledge).

1. Introduction

Effective schools are considered as an important part of the educational landscape. They can create a generation that has the ability to use knowledge to communicate, collaborate, analyze, create, innovate, and solve problems (Papa, 2011). Changes in our educational system should be implemented to improve our schools. One area of improvement that has been recognized as an important skill in educational institutions is creativity.

Research studies indicate that creativity is a complex of many factors such as attitude, values, goals, motivation, special thinking skills, appropriate knowledge, talent and opportunity. These components can be influenced by schools (Cropley, 2006). According to Fullan (1993), teachers are a critical starting point and are the most important component of educational reform as their goal is to enhance student learning. In order to create deep changes in schools, teachers need new ways of thinking, behaving, knowledge and skills. They should be able to educate students who are capable of engaging in active learning and lifelong learning, higher cognitive skills, and collaboration and capable of using effective coping skills (Kozleski, 2004).

A number of empirical studies have shown that creativity can be fostered by appropriate teacher behaviors. Teachers can stimulate the development of students' creative potential, can offer opportunities to facilitate the emergence of creativity and can also help them acquire skills and knowledge necessary to generate novel and useful ideas (West et al., 2012). Although many teachers recognize the intrinsic moral value of promoting student creativity, they do not know how to successfully implement more creative approaches (Jackson, 2005). Furthermore, they do not know that their actions and the way that they direct and support students in their creative endeavors can mobilize or stifle creative thinking (Mustapha & Abdullah, 2004). In fact, teachers need to have a clear vision and understanding of what creativity is and how it can be enhanced. They should be prepared both in the pedagogical aspect and awareness of factors that foster students' creativity.

Several studies have identified factors that contribute to creativity in educational organizations. We classify them into two broad categories, namely, organizational and individual factors (Figure 1). These factors should be assessed before and during the design and development of creative training programs. This article aims to describe, review, and integrate the results of the literature on student creativity. We provide a synthesis of what is currently known about creativity, and then suggest a number of new directions for creativity research. This study will contribute significantly to the existing knowledge on the factors that significantly contribute to the enhancement of students' creative works. Gaining an understanding of the variables that foster student creativity will be useful for teachers, policy makers, and providers of teacher professional development programs. Consequently, the study will encourage teachers to value a more varied set of skills, particularly concentrating on innovation, novelty, and discovery.

2. Creativity

"Creativity is becoming a key resource for individuals and societies and will enable us to make the most of new opportunities and to find the most productive responses to challenges as well as threats" (Poce, 2012, p. 6). Csikszentmihalyi (1999) defined creativity as a complex and contested concept that is poorly theorized. Defining creativity is difficult because it mainly depends on the context and the form or forms of creativity being enacted or represented (Harris, 2009). Various definitions of creativity can be found in the literature. For instance, Torrance (1988) defined creativity as the process of recognizing a problem, searching for possible solutions, drawing hypotheses, testing and evaluating, and communicating the results to others.

Moreover, Sternberg (2010) stated that creative work requires applying and balancing three abilities (synthetic, analytic, and practical abilities) that can all be developed. Based on this definition, creativity can be described as the ability of a person to generate novel and interesting ideas, analyze and evaluate ideas, and convince other people that an idea is worthy (Sternberg, 2010). Based on the above descriptions of creativity, we cannot simply assume that creativity will emerge automatically without any help. Teachers as change facilitators can develop their classroom environments rich in opportunities for the emergence of creativity; they can help students to produce novel and original ideas; enhance students' interest in creativity and convince them of their own potential to be creative (Cropley, 2006).

3. Factors Affecting Student's Creativity
3.1 Organizational Factors
3.1.1. Effective Leadership

Several scholars believe that leadership plays a critical role in mobilizing creativity and change in educational organizations (e.g., Andriopoulos & Dawson, 2009; Shin & Zhou, 2003). The behavior of a leader may foster or stifle the creative potential of employees. For example, a supportive supervisory management style can enhance individual motivation and creativity; meanwhile, a controlling style does not allow the creative processes to flow and provides a tightly constructed set of rules and guidelines in which members have little freedom to express their ideas (Andriopoulos & Dawson, 2009).

Gumusluoglu and Ilsev (2009) conducted a study on 163 research and development personnel and managers at 43 micro- and small-sized Turkish software development companies, and reported that leaders may influence creativity both directly and indirectly. They added that "transformational leadership behaviors closely match the determinants

of innovation and creativity at the workplace, some of which are vision, support for innovation, autonomy, encouragement, recognition, and challenge" (p. 462). These behaviors are instrumental in promoting creativity (Sosik et al., 1998). In line with this idea, Afshari et al. (2012) argued that the leadership behaviors of lecturers, such as idealized influence, intellectual stimulation, inspirational motivation, technical skills, and involvement, can influence students' creative thinking. They suggested that lecturers should encourage students to engage in research and think critically, and help their students in correctly defining their projects and identifying the requirements and resources for generating and developing new ideas. According to Haag and Coget (2010), teachers as change agents should be competent and strong role models for their students. They should support their students as they try new approaches and develop innovative ways to deal with problems. They should be able to articulate ideological goals that have moral overtones and motivate their students to commit to and become a part of the shared vision in school (Fry, 2003). Moreover, they should be able to increase the sense of competence and self-efficacy of students, which in turn will enhance their creative performance (Haag & Coget, 2010). Furthermore, Andriopoulos and Dawson (2009) stated that communication and information exchange are effective social skills that can enhance creativity. Teachers must be creative and good communicators to inspire and motivate students to collaborate and involve in creative work (Reppa et al., 2010).

3.1.2 Culture

School culture pertains to the ideas, beliefs, skills, arts, and so forth, of the faculty, staff, students, principal, and other stakeholders, which makes the school unique and different from other schools (Wilmore, 2004). School culture lies at the heart of school creativity and innovation. "It affects the extent to which creative solutions are encouraged, supported, and implemented" (Martines & Terblanche, 2003, p. 6). The right school culture unleashes the creative spirit and makes accomplishments possible (Andriopoulos, 2001).

Martine and Terblanche (2003) investigated organizational culture and creativity, and identified four dimensions of organizational culture (structure, strategy, support mechanisms, and behavior that encourages creativity) that influence the degree to which creativity and innovation occur. In the next section, each determinant will be discussed to describe their influence on promoting or hindering creativity in educational institutions.
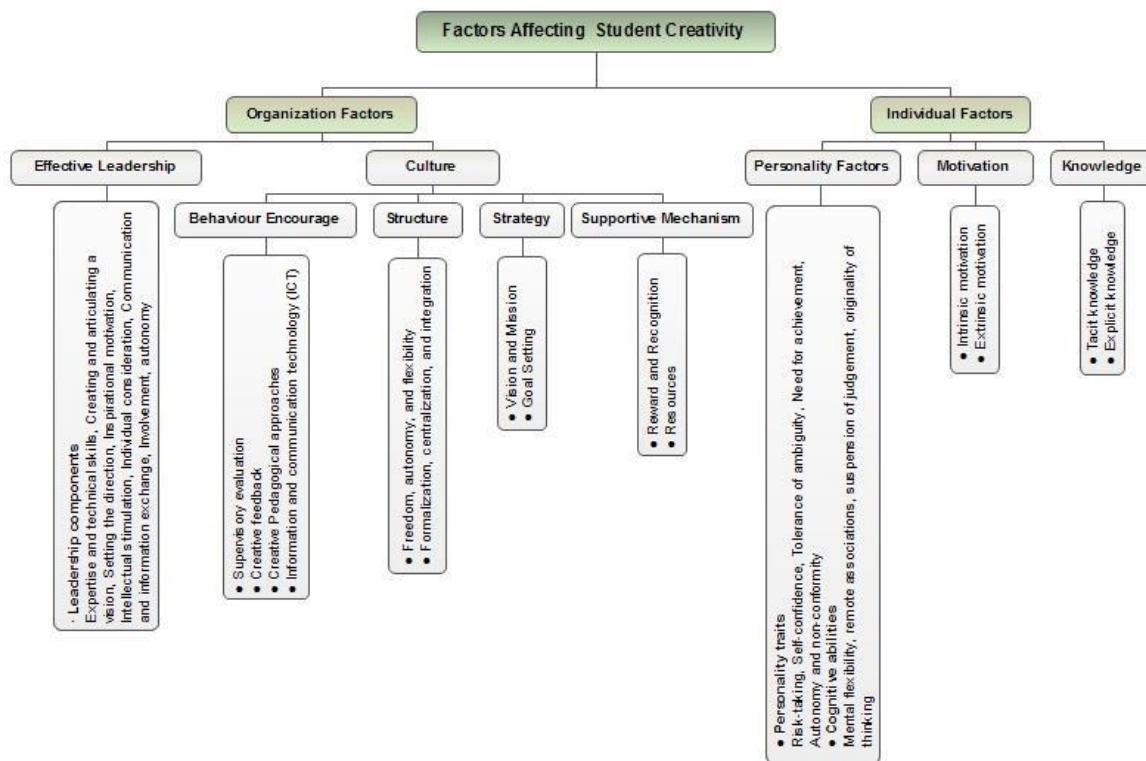
Figure 1: Factors affecting student creativity

3.1.3. School Structure
3.1.3.1. Freedom, autonomy, and flexibility

Numerous researchers believe that the type of organizational structure can be a critical factor in endorsing or inhibiting individual and team creativity in the work setting. The structures in creative organizations need to be flexible, with few rules and regulations, loose job descriptions, and high autonomy (Andriopoulos, 2001). The literature revealed that "the degree to which employees have freedom and authority to participate in decision making in solving problems determines the level of empowerment, which is positively related to the level of creativity and innovation in an organization" (Arad et al., 1997, cited in Martins & Terblanche, 2003, p.71). In line with this idea, Ahmad and Yaakub (2003) reported that students who are autonomous learners or have freedom in learning have the ability for decision making and critical reflection, as well as the skills necessary to carry out self-directed learning programs and creative activities. Creativity can be fostered when students have a relatively high autonomy and a sense of ownership and control over their own work and ideas (Amabile, 1998). Furthermore, in Germany, Krause (2004) examined the effect of freedom and autonomy on student creativity, and revealed that providing time and numerous opportunities can enhance the innovative behaviors of students such as

the generation, testing, and implementation of ideas.

3.1.3.2. Formalization, centralization, and integration

Organizational structure is usually categorized into three elements, namely, formalization, centralization, and integration (Mahmoudsalehi et al., 2012). "Formalization refers to the degree to which jobs within the organization are standardized and the extent to which employee behavior is guided by rules and procedures" (Mahmoudsalehi et al., 2012, p.521). In highly formalized schools, explicit rules and procedures are likely to hinder the freedom and flexibility needed for creativity (Chen & Huang, 2007). Conversely, a less formalized structure stimulates teachers and students to think creatively about their work, seek other sources of information, and ask different questions, thus engaging in more sense-making approaches to their work rather than purely following a predetermined course of action (Gilson & Shalley, 2004).

Moreover, centralization is the extent to which decisions are made at a single point in the organization (Andrews & Kacmar, 2001). A large body of literature has proposed that high centralization inhibits creativity because it reduces communication, commitment, and involvement with tasks and projects among participants (Chen & Huang, 2007). In contrast, in a

decentralized structure, employees have more opportunities to provide inputs and exchange knowledge, and are capable of self-organizing social interaction networks to solve new or existing problems (Chen & Huang, 2007). "Integration refers to the extent to which various subdivisions of an organization work interrelatedly" (Chen & Huang, 2007, p. 107). An integrated structure can enhance diversity by encouraging teachers and students to disperse a variety of mindsets and experiences across units and help them consider different perspectives (Chen et al., 2010). Hence, schools that are decentralized, and with more integration and less formalized structure, can enhance and facilitate students' creative behavior.

3.1.4 Strategy
3.1.4.1 Vision and mission

According to Martins and Terblanche (2003), the origin of creativity and innovation lies in the shared vision and mission of the organization. "Vision is a transcendent goal that represents shared values, has moral overtones, and provides meaning; it reflects what the organization's future could and should be" (Andriopoulos, 2001, p. 834). Hence, the leader's vision is a critical factor in managing creative individuals (Andriopoulos, 2001). Maz Jamilah et al. (2008) examined creativity among engineering students, and reported that components of organizational culture, including strategic vision and mission, means to achieve objectives, management processes, and interpersonal relationship, can enhance and stimulate students' creativity. Mumford et al. (2008) suggested that missions serve multiple critical purposes with regard to innovation: they may be used to define the ultimate goal of the creative effort, provide direction without being overly restrictive, establish guidelines for selecting and distributing resources, define the scope of potential solution paths, and build a foundation through which individual contributions can be organized.

3.1.4.2 Goal Setting

Goal setting is another useful tool for encouraging student creativity. School goals and objectives reflect the priorities and values of schools, and as a result may promote or hinder creativity (Martins & Terblanche, 2003). Lassig (2009) stated that "there are three major building blocks to form a solid foundation for creativity in schools: establishing a shared language about creativity that is understood by all stakeholders; recognizing and discussing the importance of creativity, and developing informed policy that reflects this; and developing effective practices for encouraging and enhancing student creativity in schools"(p.8). In line with this idea, Shalley and Gilson (2004) contended that students who know the importance of creativity, attempt to be creative. Hence, teachers must direct the goals toward creative outcomes and desirable end results. Clarifying outcomes enables teachers to provide students with specific information on what they should achieve.

3.1.5 Support Mechanisms
3.1.5.1 Reward and recognition

"Several organizational theorists suggest that creativity can be enhanced by expecting a reward that is perceived as a 'bonus,' a confirmation of one's competence, which can take the form of a financial reward or verbal praise" (Andriopoulos, 2001, p.835). Maund (2001) defined reward as "something which is given or received for behavior that is commendable and valuable" (p. 431). Rewards can be monetary (financial rewards) or nonmonetary (recognition or praise). Powell (2008) believed that intrinsic rewards which motivate individuals by interest, enjoyment, and satisfaction have the potential to enhance creative performance. On the other hand, several scholars emphasize that the use of extrinsic rewards (e.g., monetary incentives and recognition) can stimulate individuals' creativity (Fairbank & Williams, 2001). In line with this idea, Eisenberger and Rhoades (2001) compared two groups of students in terms of creativity tasks. The first group was rewarded during a prior training task and the second group was trained but received no monetary rewards. Findings of this study indicated that students who received money during the initial training task developed more creative task than individuals who received no money.

Moreover, Eisenberger and Aselage (2009) investigated the influence of reward on creativity and found that individuals' expected reward for high performance was positively related to creativity. It is clear that rewarding creative ideas and tasks inspires students to work harder and make them feel better about what they are doing (Sternberg & Williams, 1996). Also, "teachers should be careful what they reward, because whatever gets rewarded gets done. Whatever actions teachers reward will be repeated. That's why it's very important to reward results and to do it the right way" (Maxwell, 2011, p. 254).

3.1.5.2 Resources

The literature argues that students need to be given sufficient resources (i.e., adequate time and funds; people with necessary expertise; material resources; relevant information; and training) to develop novel work (Smith et al., 2008). According to Shalley and Gilson (2004), creativity takes time, plenty of hard work, and strenuous mental exertion. Schools should allocate an adequate amount of time to enable students to think creatively, generate new ideas, and experiment with new products.

3.1.6 Behaviors that encourage creativity
3.1.6.1 Supervisory evaluation

Several researchers have suggested that evaluation can have a dysfunctional effect on intrinsic motivation and subsequent creativity (Mumford et al., 2002; Shalley & Gilson, 2004). Conversely, other studies have reported that evaluation can positively affect intrinsic motivation and creativity. Shalley and Gilson (2004) conducted a study on the effect of expected evaluation on creativity, and revealed that individuals who worked alone, had a creativity goal, and expected to be evaluated had high levels of creativity. These results suggest that expected evaluation is not necessarily harmful to creativity and can be beneficial to creativity in certain situations. Similarly, Cummings (1965) suggested that constructive and supportive evaluation of employees is an important aspect of organizational encouragement. Therefore, teachers who want to encourage creativity should provide opportunities for creative thought in assignments and tests. They should ask questions that require factual recall and analytical and creative thinking. "Assessments do not necessarily diminish or undermine student creativity; rather, how students perceive the goal messages sent by their teachers' assessment practices is what matters" (Beghetto, 2005, p. 258).

3.1.6.2 Creative feedback

Many researchers believe that creative self-efficacy is an important factor in fostering students' creativity. Creative self-efficacy was positively associated with students holding mastery-orientation beliefs. According to Beghetto (2006), the strongest predictor of creative self-efficacy was students' reception of creativity-related feedback from teachers. "Giving feedback can be particularly important for creativity and yet particularly difficult in that creativity often involves trying new things and taking risks" (Shalley & Gilson, 2004, p. 41). Ferguson (2011) conducted a study on students' perceptions on the quality of feedback and found that students like to get personalised feedback with clear guidance on how to improve their work. Feedback guides them to accomplish their goals and adopt more effective creative techniques (Mayfield & Mayfield, 2008). In line with this idea, Zhou (1998) found that an individual who was given informational feedback had higher subsequent creativity than when the same feedback was delivered in a controlling or punitive manner. He added that feedback that is high on developmental orientation (e.g., provides students with helpful information to learn, develop, and improve) results in higher levels of creativity.

Furthermore, Dowden et al. (2011) investigated students' perspectives on the effectiveness of feedback in a regional Australian university. They found that students' emotions strongly mediated their perceptions of written feedback and suggested that teachers should provide a warm and supportive teaching and learning context where students expect to receive constructive, developmental feedback on their work.

3.1.6.3 Pedagogical approaches

Teachers play a critical role in fostering student creativity and helping students to acquire this ability. To help students become creative, teachers should stimulate the development of creative potential and help students obtain the skills and knowledge necessary to generate novel, unique, and useful ideas (West et al., 2012). Clapham (2003) introduced several training programs, such as psychogenics, hemisphericity, and psychosynthesis, to develop students' mental ability through imagery, relaxation, art, physical exercises, and music.

Furthermore, several studies have explored the aspects of pedagogical approaches that foster student creativity (e.g., Craft, 2001; West et al., 2012). One of the well-known approaches in teaching students practical skills to generate creative ideas is De Bono's "six hats" method. Some schools already use this training program to teach creativity. Based on this approach, teachers instruct students on the use of six different mindsets, including logical, critical, and emotional, to recognize and define a problem (Lau et al., 2009). Shallcross (1981) introduced a range of significant strategies in pedagogical approaches to creativity. She suggested that providing an overt "mental and emotional climate" in the classroom is essential. "The ground rules are personal guarantees that allow pupils to grow at their own rate, retain the privacy of their work until they are ready to share it, and prize their possible differences" (p. 19). In addition, several researchers believe that students who work together in teams tend to learn more. The complementary skills of team members, their commitment to a common purpose, performance goals, and mutual accountability are key distinguishing factors of teams (Andriopoulos, 2001). Markulis et al. (2006) stated that leadership plays an important role in shaping team dynamics for creativity. Teamwork usually needs effective leaders (i.e., supportive leaders) to facilitate creativity and innovation in teams. Teachers as team leaders should be competent facilitators to help their students work in a team and reach their objectives. Moreover, they should be able to balance students' freedom and responsibility, show concern for student needs and feelings, recognize creative work by individual students and teams, encourage them to voice their concerns, provide feedback, and facilitate skill development (Amabile, 1998). These leaders can enhance student

creativity and self-determination.

The literature on creativity proposes several creative training programs to mobilize creative problem solving at the team level. Most of these programs help students to use their divergent thinking, a cognitive process for generating multiple and complex ideas from a simple one (West et al., 2012). Osborn (1963) generated brainstorming techniques and established team rules and procedures to improve team problem solving by giving people the freedom to speak their minds (Byron, 2012). Electronic brainstorming, brain-writing, and the nominal group technique are the most important brainstorming techniques (Byron, 2012). All these techniques are useful in generating ideas.

Parnes (1987) refined the creative problem-solving program developed by Alex Osborn to encourage participants to work in groups and generate unique and novel ideas. Isaksen and Treffinger (2004) introduced the core processes required for creative problem solving, including problem identification and construction, identification of relevant information, generation of new ideas, and the evaluation of these ideas. Moreover, student-centered approaches, such as problem-based learning and problem-oriented project-based learning, can produce competitive graduates who can perform in complex situations. Based on the findings of Yasin et al. (2009), these two approaches promote students' critical thinking, effective communication, and problem-solving skills. A more flexible and constructive approach enabling students innovatively and creatively to transfer knowledge into real world situations is more appropriate in today's higher learning environment (Yasin et al., 2009, p. 253).

In line with this idea, Scott et al. (2004) stated that well-designed creative training programs emphasizing divergent thinking, problem solving, performance, and attitudes and behavior criteria were more effective in enhancing student creativity. Creativity training should not be considered as simply a particular program or the result of applying a fixed set of techniques (Scott et al., 2004). Such training requires proper planning (Osburn & Mumford, 2010).

3.1.6.4 Information and Communication Technology

Information and communication technology (ICT) plays an important role in enhancing education quality (Tong & Trinidad, 2005). ICT creates a powerful learning environment and transforms the learning and teaching processes in which students deal with knowledge in an active, self-directed, and constructive manner (Volman & Van Eck, 2001). It can develop students' creativity, skills for cooperation, communication, problem solving, and lifelong learning. Wheeler et al. (2002) conducted a qualitative study on primary school children to identify the impact of ICT on student creativity, and reported that ICT can enhance students' social interaction, problem-solving and creative cognitive abilities. Hence, "ICT can be considered as an effective mind tool which can liberate and foster creativity in students" (Wheeler et al., 2002, p. 377).

3.2 Individual Factors
3.2.1 Personality Factors

Some scholars believe that individuals' profile (e.g., age, gender), personality traits (e.g., risk taking, non-conformism), and cognitive abilities (mental flexibility, remote associations, suspension of judgment and originality of thinking) affect creative behaviors (e.g., Shalley et al., 2004; Shalley & Gilson, 2004; Yong, 1994).

In 1994, Yong conducted a study on 397 Malaysian secondary school pupils and found a significant relationship between creativity and intelligence. As opposed to Yong's findings, Amabile (1998) reported that individuals require a certain level of intelligence, willingness to think in non-traditional ways, and persistence over time in order to be creative. All students can be creative if they understand and learn the process of creativity and problem-solving skills. Moreover, Mostafa (2005) carried out a study on 170 managers to understand how managers in Egypt perceive creativity and innovativeness. The findings of his study indicated that managers with higher education attainment are more likely to adopt creative and innovative activities. He added that male managers have significantly favorable attitudes toward creativity compared to their female counterparts. Similarly, Instone et al. (1983) argued that men and women use different influence strategies in business activities, and showed that men and woman have different norms about how rewards should be used to influence creative organizational behavior. However, other studies demonstrated opposite results. Naderi et al. (2009) investigated the difference between gender-role identity and creativity among 153 undergraduate Iranian students, and suggested no significant difference in students' overall creative perception between female and male students. However, they reported that females scored higher in the initiative factor, whereas males scored higher in the environmental sensitivity factor.

With regard to the importance of training on creativity, Afshari et al. (2011) attempted to determine the moderating effect of training on the relationship between transformational leadership and creativity. Data were collected from 110 postgraduate students at a research university in Malaysia. Their findings indicated that training factor significantly affected the relationship between transformational leadership and

creativity. Hence, they suggested that creativity training is effective and can enhance students' divergent thinking, creative performance, problem solving, and attitudes. Additionally, Andriopoulos and Dawson (2009) stated that "individuals high on general cognitive ability tend to achieve better results on measures of job knowledge, skills and techniques and they are good at processing information" (p. 110). Furthermore, Csikszentmihalyi (1990) asserted that the most creative students tend to be sensitive, risk takers, self-confident, independent, and passionate about achieving autonomy in their work and social environment. In addition, Shalley et al. (2004) pointed out that "open individuals, those who are broad minded, curious, and untraditional, are both more flexible in absorbing information and combining new and unrelated information" (p. 937).

3.2.2 Knowledge

Gurteen (1998) defined knowledge as "know-how and know-why," and added that know-why is often more important than know-how because it allows people to be creative. Sternberg and Lubart (1999) categorized knowledge into two different types, namely, tacit and explicit knowledge. Tacit knowledge, which can be obtained through experience, constitutes knowledge that has not been formally shared and may even be difficult to share. In contrast, explicit knowledge is formalized and usually documented such that it can be shared by all. Both types of knowledge are important in creative achievement (Andriopoulos & Dawson, 2009).

Weisberg (1999) stated that knowledge is a fundamental, unquestionable building block of creativity. Similarly, Boden (2001) contended that limited knowledge in one field would hinder creativity. He introduced the "10-year rule" theory. Based on this theory, great mastery of a field and deliberate practice contribute to creativity. Taggar (2002) believed that students cannot be really creative unless they possess adequate knowledge in the particular subject (e.g., knowledge of facts, principles, and viewpoints about a diverse range of issues in the domain) and necessary skills to generate and implement ideas on that subject. With regard to the impact of tacit knowledge on creativity, Csikszentmihalyi (1999) stated that this type of knowledge provides an opportunity to engage with key gatekeepers. In other words, tacit knowledge aids convergent thinking via shared experiences. Hence, teachers should motivate students to attend conferences, seminars, and external training courses to interact with other scientists and acquire skills and knowledge. Moreover, Nonaka et al. (2006) believed that knowledge creation techniques (i.e., brainstorming) that facilitate divergent thinking, aid socialization, and externalization of tacit knowledge

help elicit creative ideas.

3.2.3 Motivation

Motivation is a key factor that stimulates creativity in everyone (Amabile, 1998). This is because those attracted to a task will become committed and devote more time to completing it and, in turn, exhibit creative behavior. Amabile's findings indicated the two basic types of motivation, namely, intrinsic and extrinsic motivations. "Intrinsic motivation refers to an internal desire to do something; it is driven by deep interest and involvement, by curiosity, and enjoyment" (Andriopoulos & Dawson, 2009, p. 125). In other words, intrinsic motivation drives individuals to engage in an activity for its own sake in the absence of external motivators.

North and Pillay (2002) conducted a study on the impact of homework on students' creativity and revealed that excessive quantities of homework run the risk of generating negative effects, such as loss of motivation and interest, and diminished student creativity. They added that teachers should offer complex, demanding, and interesting tasks to students. Such tasks provide students with the opportunity to experiment with new ways of doing things, take risks, and act creatively (Andriopoulos & Dawson, 2009). In addition, individuals who are extrinsically motivated can work creatively on their tasks because they believe that their engagement in the task will result in desirable outcomes (Pintrich, 1999). However, Amabile (1998) stated that rewards and incentives by themselves do not have a significant effect on creativity and do not compel students to become passionate about their tasks. Furthermore, Andriopoulos and Dawson (2009) believed that "teachers should provide a mix of rewards that focus on intrinsic and extrinsic motives" (p. 127), and offer students complex, difficult, and interesting assignments. Once assignments are based on the interests of students, they focus all their attention on the task at hand.

4. Conclusion

The current study cited relevant researches that provided the basis for understanding the nature of creativity and factors that enhance students' creative thinking. Most of these studies were quantitative or qualitative, and had some limitations in the assessment of creativity and creative thinking. "The complex and multidimensional nature of creativity cannot be captured effectively and comprehensively by any single instrument or analytical procedure" (Balchin, 2005, p.1). In fact, both qualitative and quantitative data should be used to understand creativity. The use of tests in education has been criticized by many individuals and groups. However, Linn and Gronlund (1995) argued that, "although most of the criticisms

of testing have some merit, most problems are not caused by the use of tests, but by the misuse of tests" (p. 496). Hence, researchers should be careful in selecting, evaluating, and using creativity assessment resources and tools.

In addition, past research studies indicated that two main factors affect students' creative thinking. These are organizational and individual factors. These factors are interrelated. Developing students' creative thinking effectively is not dependent on the availability or absence of one factor, but is determined through a dynamic process involving a set of interrelated factors. According to Fullan (1993), change implementation process is planned along three stages, namely adoption, implementation and institutionalization. Factors identified by this study as critical variables for developing students' creative thinking do not have equal impact during all stages. Hence, researchers must identify influencing factors at different stages of development.

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