Researcher:
Social Science Studies
(2017) Cilt 5, Sayı IV, s. 409-422
RSSS
ISSN:2148-2691

Innovation, Creativity and Education[1]

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Abstract

Innovation and creativity that is considered one of the pioneers in the development of micro issues do not only contribute to maintaining the organization's existence, but also provide important contributions for social development. Innovation makes the way for providing economic superiority, considering that macro dimension. The way to achieve innovative results is through training creative labor. Hence, researchers have focused on identifying the conditions that influence individual creativity and have been increasingly interested in the relation of innovation and creativity to education. J. P. Guilford (1950) in his opening speech of the American Psychological Association has touched on why schools are not training more creative individuals and has fired up the interests in the area. Education, creativity, and innovation are psychological processes that facilitate the transformation of individual work roles, teams, organizations and even countries into desired results. The purpose of this study is to demonstrate the relationship of education with creativity and innovation. Additionally, it is mentioned about creative education, the role of teachers/lecturers in creative learning and The Global Innovation Index. As a result of this conceptual study, it is emerged that preparing the conditions of innovation for the individuals leads to creative learning and teaching, and it is suggested to carry out practical researches related to this topic.

Keywords

Innovation
Creativity
Creative Learning
Innovative Teaching

İnovasyon, Yaratıcılık ve Eğitim

Özet

Mikro boyutta gelişimin öncü konularından kabul edilen inovasyon ve yaratıcılık sadece örgütün varlığını sürdürmesi için değil, toplumsal gelişim için de önemli katkılar sağlamaktadır. Makro boyuttaki önemi ele alındığında inovasyon, ekonomik üstünlük sağlamanın yolunu açmaktadır. İnovatif sonuçlara ulaşmanın yolu ise yaratıcı işgücü yetiştirmekten geçer. Bundandır ki araştırmacılar, bireysel yaratıcılığa etki eden faktörleri tanımlamaya odaklanmışlar ve yoğun bir şekilde yaratıcılık ve inovasyonun eğitim ile olan ilişkisini araştırmaya ilgi duymuşlardır. J. P. Guilford (1950), Amerikan Psikoloji Derneği'nin açılış konuşmasında okulların neden daha yaratıcı bireyler

Anahtar Kelimeler

İnovasyon
Yaratıcılık
Yaratıcı Öğrenme
İnovatif Öğretme

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yetiştirmediğine değinmiş ve bu alana olan ilgiyi başlatmıştır. Eğitim, yaratıcılık ve inovasyon; bireysel iş rollerini, takımları, örgütleri ve hatta ülkeleri arzu edilen durumlara taşımayı kolaylaştıran psikolojik süreçlerdir. Bu çalışmanın amacı inovasyon ve yaratıcılığın eğitimle ilişkisini ortaya koymaktır. Ek olarak yaratıcı eğitim, öğretmen/öğretim elemanlarının yaratıcı öğrenmedeki rolü ve Küresel İnovasyon Endeksi'nin konuyla ilgili verilerine değinilmektedir. Bu kavramsal çalışmanın sonucunda, bireyler için inovasyon koşullarını hazırlamanın yaratıcı öğrenme ve öğretmekten geçtiği ortaya çıkmakta olup konuyla ilgili uygulamalı araştırmaların yapılması önerilmektedir.

INTRODUCTION

In the global economy, the rapidly held change and transformation pushed organizations to turn into open systems and motivated them to exchange information. The increment of knowledge by sharing has highlighted the strategic importance of the human factor in these structures. Since the transition to post-industrial society, the period of thinking, creating and self-actualization has started for individual (Düren, 2000: 97). This is not only important for the individual or organizational level, but this is also important for societal/country level. Organizations seek for creative employees in order to develop innovative solutions for their customers and correspondingly countries transformed their education curriculums embedding creativity based methods.

Creativity and innovation are getting increasingly been important for the development of the 21st century information society. They contribute to economic prosperity as well as to individual and social well-being and are essential factors for more competitive and dynamic countries. Education is accepted as fundamental in fostering creative and innovative skills (Ferrari et al., 2009). The innovative activity of organizations as a reaction to the enduring changes in the environment, and the competitive advantage that can occur from such innovative behaviour, has attracted the attention of several researchers who try to specify the factors that favor innovation (Damanpour, 1991; Wolfe, 1994; Damanpour and Gopalakrishnan, 1998). The emergence of new structural designs, the increasing importance of the inter-organization relationships and the development of information technologies reveals new questions worth questioning (Hitt, Keats & De Marie, 1998).

Being willing to transform and innovate is essential to the success of the economy. Individuals aim to ensure that his/her skills remain relevant and in demand, in other words, feel the obligation to invest in him/her. Likewise, it is critical what a company offers. Companies need to adapt to the evolving needs and demands of their customers. McLean (2005) stated that creativity plays a critical role in society. Organizations are bringing creativity to life through innovative products and services that customers desire, therefore fulfilling customers' needs, creating jobs, and contributing to the economy, or whether the organization is the local government using ideas in a creative way to meet the needs of the community, therefore increasing the quality of life (McLean, 2005).

In order to meet the desire of customers with innovative solutions, organizations have to hire and keep creative employees. The changing nature of work in today's global economy makes employees more likely than ever before to change jobs and professions, share information, move from one organization to another, or work virtually. Leaders believe in fostering innovation will conclude with strengthening synergy. Therefore, organizations

become cautious in keeping employees which have high creative performance. The hard conditions of doing business in today's global economy make organizations more innovation-oriented and makes national education systems more creativity oriented. Innovation has been defined in many ways, including; Peter Drucker's definition as "the process by which knowledge is developed and applied in new ways to the needs and material operations of society." and Gifford Pinchot's definition as "to create and bring into profitable commercial use new products, processes and businesses." (as cited in Tanner, 2007). As seen as the definitions have a vital element in common, the **creative thinking**. To maintain a strong competitive position, companies need to generate entirely new ideas and new solutions. To accomplish this, it was necessary to enhance the environment for creative thinking and innovation and to educate employees in creative thinking skills and their practical application (Tanner, 2007).

Studies on creativity began after the mid of nineteenth century. They focused especially on the conditions make people creative, such as cognitive processes, personal characteristics, and environmental/social factors. Amabile and Pillemer stressed that over the years, examination of social and environmental influences on creativity has become increasingly vigorous, with broad implications for the psychology of human performance, and with applications to **education**, business, and beyond (Amabile and Pillemer, 2011). Frese (2000) suggested that the growing significance of creativity, innovation, and initiative would lead to an increasing importance of applied psychology in general: "Since ideas and attitudes of people become more important for increasing productivity, the development of work and organizational psychology becomes a factor for a society to be able to compete globally" (Frese, 2000, p. 432; as cited in Rank et al., 2004).

Fostering creativity in education is intended to address many concerns. As a summary, this includes dealing with ambiguous problems, coping with the fast-changing world and facing an uncertain future (Parkhurst, 1999). Perhaps the most dominant current argument for policy is the economic one. The role of creativity in the economy is being seen as crucial (Burnard, 2006) to assist nations in attaining higher employment, economic achievement and to cope with increased competition (Shaheen, 2010). It is for this reason that creativity cannot be "ignored or suppressed through schooling" (Poole, 1980; as cited in Shaheen, 2010).

This study aims to review the literature by focusing on the definitions of innovations and creativity, the relationship between innovation and creativity and the relationship of education to creativity and innovation. In the global innovation index, education systems of the countries listed according to innovation successes were critically examined in order to disclose the effect of education on creativity and innovation.

Innovation

In the global economy, the rapidly held change and transformation pushed organizations to turn into open systems and motivated them to exchange information. The increment of knowledge by sharing has highlighted the strategic importance of the human factor in these structures. Since the transition to post-industrial society, the period of thinking, creating and self-actualization has started for individual (Düren, 2000: 97). This is not only important for the individual or organizational level, but this is also important for societal/country level. Organizations seek for creative employees in order to develop innovative solutions for their customers and correspondingly countries transformed their education curriculums embedding creativity based methods.

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Creativity

Although J. P. Guilford's milestone discourse to the American Psychological Association in 1950 (Guilford, 1950) encouraged researchers to seriously probe creativity as a cognitive and social process as well as a personality trait, the field stayed rather narrow for many years. In the 1950s, 1960s, and early 1970s, researchers in the area explained the creativity as a quality of the person; most people lack that quality; people who possess the quality (geniuses) are different from everyone else. In the mid-1970s, Teresa Amabile, in her Stanford psychology graduate program, explored the literature out of a long-standing curiosity about creativity. She prepared a deep psychological study including widely-recognized creators in fields such as architecture, mathematics, and creative writing, comparing them to less-accomplished peers (Amabile and Pillemer, 2012).

Another important researcher in the field is E. Paul Torrance, who formed the Torrance Tests of Creative Thinking (TTCT, Kim, 2006). Torrance (1966, p. 6) defined creativity as a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; searching for solutions, making guesses, or formulating hypotheses about the deficiencies (Torrance, 1966; as cited in Kim, 2006). With that work, he unleashed a torrent of instruments devised by other researchers to detect various aspects of creative ability, creative personality, or both (Amabile and Pillemer, 2012).

Creativity is generally defined as the production of novel, useful ideas or problem solutions. It refers to both the process of idea generation or problem-solving (Amabile, 1983; Sternberg, 1988; as cited in Amabile et al., 2005). Much of the empirical research has defined creativity as an outcome, focusing on the production of new and useful ideas concerning products (goods and services), processes, and procedures (e.g., Amabile, 1996; Ford, 1996; Oldham & Cummings, 1996; Shalley, 1991; Zhou, 1998). Amabile (1996) states that "in order to be considered creative, a product or an idea must be different from what has been done before".

In contrast to the traditional approach, the contemporary approach to creativity research accepts that all people with normal capacities can produce moderately creative work in some domain. **Creativity** is the production of novel and useful ideas in any domain

(Amabile, 1996). Also, Sternberg and Lubart (1999) define creativity as "the ability to produce work that is both novels (i.e., original, unexpected) and appropriate (i.e., useful, adaptive concerning task constraints)" (p. 3; as cited in McLean, 2005). Heunks (1998) defines **creativity** as divergent thinking to conceive new ideas.

Relationship between Creativity and Innovation

Shalley and Gilson (2004) express that increasingly, creativity has become valued across a variety of tasks, occupations, and industries. In today's dynamic work environment, managers continue to realize that, in order to take competitive advantage, they need their employees to be actively involved in their work and try to generate novel and appropriate ideas, products and processes. Amabile (1988) reflects that individual creativity provides the foundation for organizational creativity and innovation, and Nyström (1990) believes that these have been linked to firm performance and survival (as cited in Shalley and Gilson, 2004).

Creativity and innovation are obviously inter-related. Creativity, as mentioned before, is seen as the "infinite source of innovation" (EC, 2008). With this lens, innovation can be perceived as the application and implementation of creativity (Craft, 2005; as cited in Ferrari et al., 2008). Also, Heunks (1998) defines **creativity** as divergent thinking to conceive new ideas, whereas **innovation** is the successful technical and economic implementation of a creation. If creativity as a matter of divergent thinking has to result in innovation, it should be followed by convergent thinking (Nyström, 1979, p. 40; as cited in Heunks, 1998). Innovative firms should balance between internal flexibility and control, whereas more positional (less innovative) companies are less interested in divergence and flexibility and prefer convergence and control by theoretical analysis and formal planning (Heunks, 1998). This can be interpreted as the firms which are not innovative; are depending on rules, strict and not employee participative.

Creativity typically refers to the production of new and useful ideas by an individual or a small group of individuals working together (Amabile, 1996). Innovation is defined as the "intentional introduction and application within a role, group or organization of ideas, processes or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, organization or wider society" (West & Farr, 1990, p. 9; as cited in Rank et al., 2004). Different fields seem to favour one concept above the other, for instance in business the word "innovation" is used even when it refers to the creative process and work (Sternberg & Lubart, 1999; as cited in Ferrari et al., 2009).

"Innovation is primarily an inter-individual social process, whereas creativity is to some extent an intra-individual cognitive process" (Anderson & King, 1993; Rank et al., 2004). According to West and Farr (1990, p. 252; as cited in Heunks, 1998) innovation is the conception of a new idea, converted into practice, and exploited as much as possible, whereas creativity is only the conception of the ideas. Hence, creativity refers to idea generation, whereas innovation refers to idea implementation (Rank et al., 2004).

Relationship of Innovation and Creativity to Education

Not only is the economic situation changing in the world, but the rate of change is escalating fast. Employers need people who are able to produce creative and innovative ideas because, if they fail to respond to new challenges, businesses will quickly be overtaken by their competitors (Sharp and Le Métais, 2000).

In fact, creativity is seen as a desired quality for the various fields such as "admissions to graduate school" (Enright & Gitomer, 1989) up to day. Moreover, creativity has been described as the most precious economic resource of the 21st century (Florida, 2002, p. 385).

A number of countries are placing a new emphasis on the importance of developing creativity within the curriculum. One of the main reasons for this is the acknowledgment that creativity is essential to economic competitiveness which is placed a high value on intellectual capital (Sharp and Le Métais, 2000). Ferrari, Cachia and Punie (2009) demonstrate that creativity and innovation can play an important role in the knowledge society. Creativity is conceptualized as a *skill* that everyone can develop and it can, therefore, be fostered or inhibited. Education specialists have the power to uncover the individuals' creative and innovative potential (Ferrari et al., 2009).

Psychometric approaches have highlighted that creativity is generally seen as a talent, or as a characteristic of elite people and distinctive personality traits have been identified to illustrate a creative mind. At the same time, a number of studies recognize that creativity can be increased and advanced (Ferrari et al., 2009). It is useful to distinguish between high creativity - "Big C" and ordinary creativity – "Little C". The Big C creativity is exemplified in some of Gardner's (1993; as cited in Grainger and Barnes, 2006) studies of highly creative individuals, such as Picasso, Einstein and Mozart. Their creative achievements are exemplary and comprise novelty and excellence in their domain, as well as social recognition and valuation (Ferrari et al., 2009). On the other hand, the Little C creativity which Craft (2000; 2001; Grainger and Barnes, 2006) highlighted, is not for the gifted and talented. It could be seen as behaviour and mental attitude, or as the ability to find new and effective solutions to everyday problems (Grainger and Barnes, 2006). LCC seems particularly suitable for the educational sector. According to this idea, creative potential can be found in every child (Runco, 2003); it can be encouraged or discouraged (Sharp, 2004); and its improvement relies on the kind of training person receives (Esquivel, 1995).

Besides creativity, there is also a need for individuals to be flexible, given the fact that they can expect to change companies and even career paths several times in the course of their working lives. These influences have led governments to admit the importance of building 'creative capital' and to recognize that curriculum and teaching methods must help to reach this goal (Sharp and Le Métais, 2000).

INSEAD[3]-WIPO[4]-Cornell University[5] rank 142 countries on their innovation capabilities. In its 6th edition, the GII measures 142 countries, using 84 indicators, which include the quality of universities, availability of microfinance and venture capital, to gauge innovation capabilities and measurable results. Five input pillars capture elements of the national economy that enable innovative activities: (1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication, and (5) Business sophistication. Two output pillars capture actual evidence of innovation outputs: (6) Knowledge and technology outputs and (7) Creative outputs.

Table 1: Rankings of top 10 countries in Global Innovation Index (comparative 2012-2013 years)

[3] INSEAD: The Business School for the World, www.insead.edu
[4] WIPO: World Intellectual Property Organization, www.wipo.int
[5] Cornell University, www.cornell.edu

Countries	2012	2013
Switzerland	1	1
Sweden	2	2
United Kingdom	5	3
Netherlands	6	4
United States of America	10	5
Finland	4	6
Hong Kong (China)	8	7
Singapore	3	8
Denmark	7	9
Ireland	9	10

Source: (GII, 2013)

The inclusion of creativity into educational policy documents is evidence of the fact that the focus on creativity (Csikszentmihalyi, 1996; as cited in Shaheen, 2010). O'Donnell and Micklethwaite (1999) reviewed the curriculum documents of 16 (developed) countries, (American, European and East Asian), identifying the place of arts and creativity in education. Not surprisingly, the most of countries in GII list above (Cornell University, INSEAD, and WIPO, 2013) take place in their research in which they found creativity was included at various educational levels, at least from early years through primary education. Some of them are below:

- In Switzerland; due to lack of natural resources, education and knowledge have become very important resources. At primary school level, pupils develop their intellectual, creative, physical and artistic abilities. Students are expected to develop a sense of responsibility in relation to themselves, the environment, other people and society, thus obtaining basic knowledge and skills for their personal educational path (CSRE, 2010).
- In Sweden, the Government's National Development Plan for Pre-School, School, and Adult Education stated that education should provide "the conditions for developing creative skills" (O'Donnell & Micklethwaite, 1999).
- In the United Kingdom; in the 1990's a number of policy documents and statements emerged for UK home countries which included creativity. In 1997 the White Paper, Excellence in Schools, referred to preparing people for the 21st century by recognizing their "different talents" (Craft, 2001).
- In the Netherlands; one of the principles on which primary education is based is "creative development" (O'Donnell & Micklethwaite, 1999).
- In Singapore; the aim of new initiatives, launched by the Ministry of Education, was to foster, "enquiring minds, the ability to think critically and creatively" (O'Donnell & Micklethwaite, 1999). These initiatives included the "Thinking Schools, Learning Nation" (TSLN) program (Tan, 2006) designed to develop thinking skills and creativity in students. This was in response to leading

industrialists and entrepreneurs indicating that staff in Singapore was more "conforming" than 'independent" and "not curious enough" (Tan, 2006).

- In Hong Kong; the education policy proposal includes creativity as "higher order thinking skills". There are educational reforms being carried in preschool, primary and secondary education in which development of creativity is being given a "top priority" (Fryer, 2003).
- In the United States of America; in 1989, governors of all US states agreed upon six goals for improving the education system by the year 2000. One of these goals is that: "…every school in America will ensure that all students learn to **use their minds well**, so they may be prepared for responsible citizenship, further learning and productive employment in the nation's modern economy" (O'Donnell & Micklethwaite, 1999).

As seen, the most innovative countries in the world, have based the education systems on using mind, being researcher and productive, thinking different from others and create newness.

Creative Learning

As seen above, **creativity** has generally been defined as a product or process that shows a balance between originality and value. It is an ability to make unforeseen connections and to generate new and appropriate ideas. **Creative learning** is, therefore, any learning which involves understanding and new awareness, which allows the learner to go beyond notional acquisition, and focuses on thinking skills. It is based on learner empowerment and centeredness. The creative experience is seen as opposed to the procreative experience (Ferrari et al., 2009). Torrance (1981; as cited in Fasko, 2001) noted several signs that indicate when creative learning occurs, such as improved motivation, alertness, curiosity, concentration, and achievement. Thus, teachers can benefit from these signs (Fasko, 2001).

"Creativity is an essential life skill, which needs to be fostered by the education system(s) from the early years onward" (Craft, 1999). This statement expresses the importance of playfulness, imagination and creativity in learning for children, young people and adults, and the role that schools might play in promoting these qualities in learning experiences (Shagoury-Hubbard, 1996; as cited in Craft, 2001).

Developing children's creativity during their years in education is the start of building "human capital" upon which, according to Adam Smith and successive commentators, depends the "wealth of nations" (Walberg, 1988; as cited in Shaheen, 2010).

Creative and Innovative Teaching

Teaching for creativity, or enhancing learners' creative skills, requires the practitioners to be creative themselves and to provide learners with an ethos and a culture that values creativity (Craft, 2005).

According to Torrance (1981, as cited in Fasko, 2001), the purpose of creative teaching is to create a "responsible environment" through high teacher enthusiasm, appreciation of individual differences, and so on.

Teachers are key components (Sharp, 2004) and builders of a creative climate conducive to creative learning (Esquivel, 1995). They provide the balance between structure

and freedom of expression and determine the triggering or hindering of students' creative output (Beghetto, 2005).

Some teachers are **traditional**, while others are **innovative**. Research indicates that traditional teachers tend to discourage students' individual autonomy (Ng, 2002) which affects their creative performance Ferrari et al., 2009). Creative performance is more likely to occur with a teacher who empowers students (Craft, 2005). **Innovative teachers** welcome a democratic classroom (Esquivel, 1995) where everyone has a voice. They foster students' independence and empower those (Woods, 2002; as cited in Ferrari et al., 2009).

CONCLUSION AND SUGGESTIONS

Nations need to raise an "educated workforce" in order to respond to "economic needs" (Craft, 2005). In this direction, education systems are being to *require a major overhaul in resources, attitude, and understanding* so as to increase the value of creativity (Turner-Bisset, 2007; NESTA, 2009). As a response to such calls, there has been a shift in educational policy around the world and efforts are being made to combine creativity and knowledge (Dickhut, 2003).

It appears from what has been documented in the literature that the researches in creativity and education have taken place in European and American countries. It shows they take into consideration the "creativity in education". According to Oral (2006), for many developing countries, creativity remains neglected, whereas, in developed countries, educational philosophy and goals depend on student's enhancement of creativity and self-actualization. For developing countries, integration of creative thinking skills in education is a crucial need for shaping their future orientations and actualizing reforms in political, economic and cultural areas (Oral, 2006).

As innovation is the main competitive advantage factor for companies and also countries in today's globalized economy; in order to initiate and improve innovation, government policymakers must launch creative education systems in their countries. Creative education generates creative individuals. Creative people generally are original, vivid, highly sensitive, passionate, curious, perfectionist, risk-taker, very independent and they have unusual ideas, high intelligence and ability to solve problems (Heylighten, 2012). So if the education systems are launched to discover and enhance the creativity of students, there will be creative adults. I mean by creative adults, innovative and entrepreneurial workforce.

Official accounts of learning in vocational education and training emphasize the acquisition of technical skills and knowledge to foster behavioural competence in the workplace (Colley et al., 2003). In other words, **vocational education** focuses on teaching the skills needed to perform a particular job and providing graduates with marketable skills. After graduating from such a school, an individual will be able to immediately enter the job market with his or her skills. From these definitions, it is understood that graduates of vocational schools are the employees doing the work. They are the first-grade employees in production or administration of companies. They do not plan or manage the works, they do the works. Therefore, vocational employees should make reformative suggestions about the work they do, in other words, they should be innovative. In order to be innovative, they should study in a creative school environment and be accustomed to express his/her creative ideas without hesitation. As Beghetto (2005) points out, teachers might ask students to use

their creativity in the design of a project or might refer to a student's response as creative, without explaining what they mean.

Walberg (1988; as cited in Shaheen, 2010) states that schools are being seen as places for the encouragement of creativity because they can do this in a "more efficient" manner and can develop it "not merely in elites but in masses of students". In fact it is being said that creativity needs to be "fostered by the education system from the early years onward" (Craft, 1999) and that elementary and secondary education may be more important than university or vocational education for "national prosperity and welfare" (Walberg, 1988; as cited in Shaheen, 2010).

Teaching for creativity implies allowing individuals to take responsibility for their own learning. Individuals ought not to be considered as only receivers of information; on the contrary, it is important that they assume the role of discovery, but support and guidance are needed in order for them to succeed. For this, teachers need to be aware of the ways and means to foster autonomy and **student-centeredness** (Simplicio, 2000).

Implementing creativity in education is particularly challenging because the control over teachers' pedagogies and learners' performances is higher than a creative environment could withstand (Craft, 2005). Creativity needs time, flow, interaction, suspension of judgment, and risk-taking, all these being attitudes that go against traditional school institutional principles. Schools mandate standardization (Christensen et al., 2008; as cited in Ferrari et al, 2009), creativity requires uniqueness (Ferrari et al., 2009). Policies should offer a balance between freedom and control, and, most importantly, should provide enough time to teachers and students, away from propositional knowledge, to internalize and experiment (Craft, 2005).

As indicated in the studies, individuals have creativity at a certain level. This level may be less in some people and more in others. The important point is the environmental factors that enable creativity to emerge and be used. One of these factors is education. Education, on the one hand, provides the individual to get and process knowledge (learn) for use in the innovation process; on the other hand, offers an environment for creative thinking and expressing of thoughts. In this context, creative teaching activities play an important role in the individual's innovative development. In the case of assessing at the macro level, countries should base/reform their education systems on creative and innovative teaching models in order to train qualified (creative and innovative) citizens.

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