

# Contributions to Education from the Psychology of Innovation and Entrepreneurship, in Today's Knowledge Society

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## Abstract

The globalized Knowledge Society of the 21<sup>st</sup> century brings with it important changes in models of work and lifestyle, triggered by the revolution in Information and Communication Technologies (ICTs). It has led to new ways of understanding knowledge itself, human activity, and consequently, professional and economic activity. In this current socio-educational and socio-economic context, more than ever, it makes sense to ask whether the mission and vision of commonly used educational models, that is, the educational purposes pursued, should be adjusted in the light of new context-driven training demands for the present and upcoming generations.

This paper is structured in several parts. First, the concepts of *Creativity*, *Innovation* and *Entrepreneurship* are defined, as well as their relationships and role in the R&D&I value chain. Next is a justification of why the *Knowledge Society* needs persons with creativity, innovation and entrepreneurship. Third, and at the heart of this review, we address the need for a *Psychology of Innovation and Entrepreneurship* and its contributions to educational processes for developing these competencies. Fourth, we suggest the implications of such contributions in an emerging educational paradigm, *Education for Competency in Innovation and Entrepreneurship*, where we analyze what kind of learning would be involved in this competency, as well as cross-curriculum proposals to be integrated across educational processes. Conclusions and further educational implications are discussed in closing.

*Key words:* Psychology of Innovation, Psychology of Entrepreneurship, Education for Innovation and Entrepreneurship, Competency in Innovation and Entrepreneurship, Knowledge Society.

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## Resumen

En la actualidad, la Sociedad Globalizada del Conocimiento del siglo XXI, ha supuesto grandes cambios en los modelos de trabajo y en nuestras propias vidas, asociados a la revolución de las Tecnologías de la Información y de la Comunicación (TICs), lo que ha llevado consigo nuevas maneras de entender el propio conocimiento, las actividades humanas y, por ende, las actividades profesionales y económicas. En este contexto actual, socioeducativo y socioeconómico, parece que tiene sentido –más que nunca- plantearse si deben producirse ajustes en la misión y visión de los modelos educativos al uso, es decir, en las finalidades educativas que se pretenden, para reajustar las mismas a la luz de las nuevas demandas contextuales de formación en las generaciones del siglo XXI.

Este trabajo se estructura en varias partes. En primer lugar, se definen los conceptos *Creatividad, Innovación y Emprendimiento*, así como sus relaciones y papel en la cadena de valor I+D+i. A continuación se justifica por qué la *Sociedad de Conocimiento* necesita personas con creatividad, innovación y emprendimiento. En el tercer punto, nuclear de esta revisión, se aborda la necesidad y aportaciones de la *Psicología de la Innovación y del Emprendimiento* a los procesos educativos centrados en el desarrollo de estas competencias. En cuarto lugar, se proponen las implicaciones de las aportaciones anteriores en un nuevo programa educativo emergente, la *Educación para la Competencia en Innovación y Emprendimiento*, analizando los aprendizajes propios de esta competencia, así como las propuestas curriculares a integrar transversalmente en los procesos educativos. Se finaliza con las conclusiones y las implicaciones educativas de esta propuesta.

*Palabras clave:* Psicología de la innovación, Psicología del Emprendimiento, Educación para la Innovación y el Emprendimiento, Competencia en Innovación y Emprendimiento, Sociedad de Conocimiento.

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## Introduction

One of the ongoing challenges of any educational system (formal, non-formal or informal) is to promote development of the whole person and the competencies needed by new generations in order to be happy and fully integrated in the sociocultural and economic context in which they are to live. Inasmuch as the system fulfills this task, it is addressing its mission; if it does not do so, it is missing its opportunity to equip new citizens with tools for their insertion in the labor market and for their full integration in the complex societies of this century.

In order to know what educational purposes a given system ought to fulfill, and whether these purposes are well designed, one needs only to analyze in detail the socioeducational and socioeconomic context in which the students are going to live. The globalized Knowledge Society of the 21<sup>st</sup> century brings with it important changes in models of work and lifestyle, triggered by the revolution in Information and Communication Technologies (ICTs). It has led to new ways of understanding knowledge itself, human activity, and consequently, professional and economic activity. Furthermore, global interconnectedness gives rise to a new business model, based on ICTs and rapid processes of change and innovation. At the same time, traditional business and professional models, based on geographic proximity and the continuance of parental vocational roles, falter when faced with globalization, innovation in market niches and diversification, marking a turning point in how training and labor market access are understood.

In this current socio-educational and socio-economic context, more than ever, it makes sense to ask whether the mission and vision of commonly used educational models, that is, the educational purposes pursued, should be adjusted in the light of new context-driven training demands for the present and upcoming generations. In order to face this challenge, the nascent *Psychology of Innovation and Entrepreneurship*, postulated in this paper, can contribute important elements for analyzing the current educational situation, and propose educational guidelines and implications based on research and its own empirical orientation. It can also make important contributions toward integrating innovation, entrepreneurship and the R&D&I value chain in present-day educational processes, if we want future citizens to understand their value for prosperity and a knowledge-based economy.

In response to this, the present paper is structured in several parts. First, the concepts of *Creativity*, *Innovation* and *Entrepreneurship* are defined, as well as their relationships and role in the R&D&I value chain. Next is a justification of why the *Knowledge Society* needs persons with creativity, innovation and entrepreneurship. Third, and at the heart of this review, we address the need for a *Psychology of Innovation and Entrepreneurship* and its contributions to educational processes for developing these competencies. Fourth, we suggest the implications of such contributions in an emerging educational paradigm, *Education for Competency in Innovation and Entrepreneurship*, where we analyze what kind of learning would be involved in this competency, as well as cross-curriculum proposals to be integrated across educational processes. Conclusions and further educational implications are discussed in closing.

### **Creativity, Innovation and Entrepreneurship**

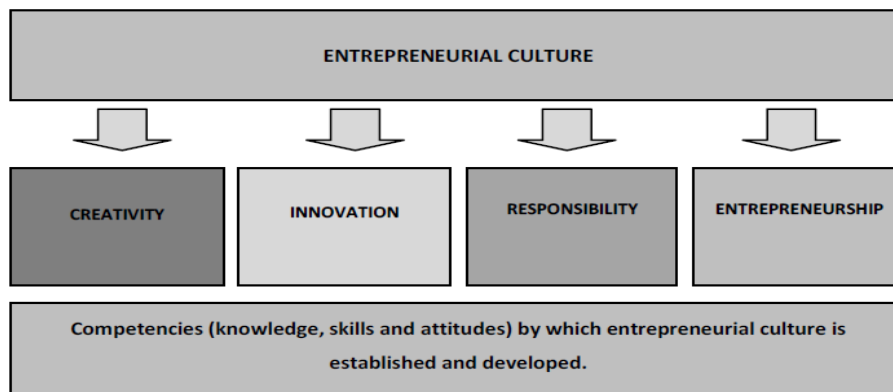
What are innovation and entrepreneurship? How are they related to creativity? According to the dictionary of the Spanish Royal Academy, *creativity* refers to engendering. This is the literal meaning of the term creativity and its etymological origin. Creativity is the process of bringing a problem to mind with clarity (whether by imagining, visualizing, supposing, meditating, contemplating, etc.) and then originating or inventing an idea, concept, notion or schema along new or unconventional lines. It involves inquiry and reflection more than action.

Creativity is the capacity to see new possibilities and to do something about them. When a person goes beyond analyzing a problem and tries to put into practice a solution, change is produced. This is referred to as creativity: seeing a problem, having an idea, doing something about it, having positive results. The members of an organization must promote a process that includes opportunities for imagination, experimentation and action. Synectics is a discipline that develops methods or sets of strategies for promoting creativity and productivity.

*Innovation* is defined by the Royal Academy as any change that introduces something new, or also as a synonym for creation. It means generating and successfully implementing a new idea, product, service or business in the market, obtaining a tangible benefit from the

generation of ideas, from identifying opportunities and successfully taking advantage of them. In short, it means converting ideas into value (Reyes, 2009). *Entrepreneurship*, however, refers to running a *business* or *project*. It involves effort and confronting diverse difficulties in order to attain something specific (Frese & Rauch, 2000).

Looking at the three definitions, it is not difficult to understand that they are three complementary but differentiated psychological processes. *Creativity* is a primary process of conceptualization, forming the basis for the other two. *Innovation* is a secondary, applied process, where creativity is applied to the creation of a new process, product or service. *Entrepreneurship* is a tertiary psychological process that involves launching some type of business or system that exploits the existing innovation. This set of elements has been referred to as entrepreneurial culture (Junta de Andalucía, 2011, p. 119). See Figure 1.



**Figure 1. Sub-processes of an entrepreneurial culture**

*Creativity, Innovation, Entrepreneurship: The R&D&I value chain*

The three sub-processes, as conceptualized above, are sequential and recurring parts of generating, developing and implementing any human creation. *Creativity*, in essence, is a psychology process belonging to the realm of ideas, theorizations or conceptualizations for solving problems. The act of creating is initially conceptual, regardless of whether it is a new scientific theory or applying a relationship between objects in order to solve a given problem. No one can deny the creativity of our forerunners in applying new relationships, connecting gasoline with coaches, or a coin with key-operated lockers – a priori, unrelated. Therefore, creativity, discovery and research are closely related. In the realm of science, research is essential to the realization of new scientific proposals or creations, where research is understood

to yield precise knowledge of relationships between concepts, principles or elements of reality. In this case we could speak of *scientific or conceptual creativity*, characteristic of *scientific research*. This type of primary creativity is essential for the advance of knowledge and science, but such creativity *per se* does not produce innovation.

However, there is another more applied modality of creativity, foundational to developing new processes, products or services: *innovation, or development*. In this sphere we find the development of mechanisms, changes in assessment or treatment processes, in productive processes and in management of processes, products or services. There must be an ultimate, measurable product that can be registered, or better yet, patented, in order to protect its application value, its value for meeting needs or problems of society, in any of its economic, scientific or social activities. We may consider that innovation exists when the ideas generated have materialized in the *technological development* of new processes, products and services that can be marketed or that bring about some kind of benefit. This process may be closely linked, though not always, to research conceptualization; the two are independent, in that precise knowledge of scientific processes and problems, and of new scientific models (concepts) *may* help to launch new innovative developments (procedures) that constitute innovation, but this does not always occur. Changes in processes, products and services may be introduced directly in the applied context, without proceeding from theory or science. However, with high-level technological developments, such as new systems of assessment, intervention and applied ICTs, it is essential to understand the state of the art or scientific status of the problem, its previous technological development, if one wishes to make really innovative adjustments or changes.

Finally, there is creativity applied to the market, called *entrepreneurship*, focusing on exploitation or transfer of products, processes and services, already developed, by means of formal systems for transfer or commercial exploitation, such as business creation or technology transfer. This final activity is what really creates wealth and business; consider that, without this final link in the chain, the two prior activities do not do so.

When the three creative activities mentioned above (research creativity, innovative development and entrepreneurial transfer) are set to work in conjunction, a value chain is produced:  $R$  (*scientific research*) +  $D$  (*technological development*) +  $I$  (*entrepreneurial transfer*),

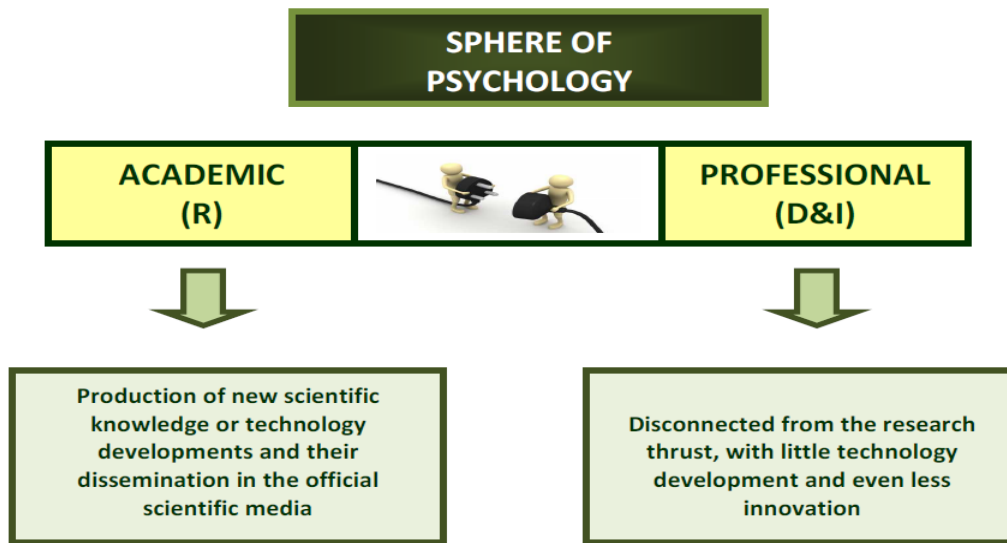
in any field of knowledge. One example can be seen in recent proposals from the field of Psychology (De la Fuente & Vera, 2010)

*Professional profiles and positioning in the R&D&I value chain*

Professional profiles shaped in the recent course of economics, academics and society have not always contributed toward the integration of these three elements, namely, of research, technological development and the transfer of innovation. We find different positionings along the R&D&I value chain. Usually, *research* professionals are located on the research end of the chain, focusing more on producing science and knowledge for a better understanding of the explanatory mechanisms for each object of their study. Their daily activity is to create models, theories, and relationships that describe, explain, and predict the aspects being examined. On a few occasions, these professionals *develop applied technology* for assessing and intervening in the problems they are studying.

Applied professionals, however, are more interested in the second link in the chain, specific *technological developments* that allow them to manage and intervene directly in their professional reality. A large part of their activity focuses on identifying problems and making decisions on how to assess and intervene in such problems, responding to the demand. New professional developments may emerge, and may be implemented as innovation, in a company or other workplace. In this case, *innovation* is an implicit component required for meeting new demands in professional practice. However, things do not always occur in this way. This has been referred to as “broken links, or lack of integration, of the R&D&I value chain” (De la Fuente & Vera, 2010), graphically represented in Figure 2.





*Figure 2. Disconnect between the elements of the R&D&I value chain*

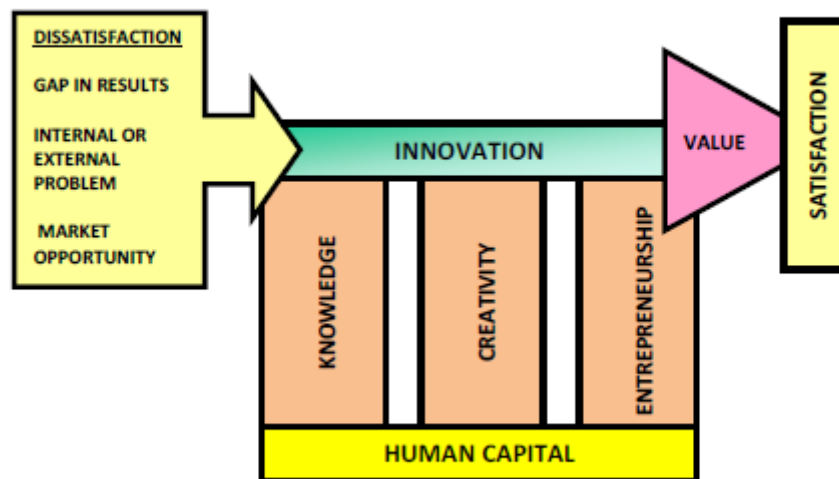
The consequences of this disconnect are:

- 1) Each sphere focusing on its own sphere of knowledge and competencies. In other words, researchers devote themselves preferentially to the activity of research, with little interest in technological development or in transferring knowledge to the business of professional practice. Practitioners, for their part, want to respond to professional demands and to innovate, although there is not always a connection with advances from research.
- 2) Difficulty in defining common, integrated projects with an orientation toward Research & Development & Innovation, projects that generate new jobs and new, competitive products in the market.

### **Why the Knowledge Society needs people with creativity, innovation and entrepreneurship**

There is ample evidence to indicate that productive processes in a Knowledge Society require people who are able to spur on the innovation process. The labor market must respond to market characteristics (Reyes, 2009): (1) constant growth of knowledge and technology, (2) ever shorter product/service life cycles, (3) demand for faster time to market, (4) offerings based on value rather than cost (value proposition), (5) radical innovations. For all these rea-

sons, innovation is at the heart of value creation, based on knowledge, creativity and entrepreneurship. See Figure 3 and Appendix I.



*Figure 3. Innovation as central to value creation (taken from Reyes, 2009)*

### **The need for a Psychology of Innovation and Entrepreneurship, and its contributions**

As we have established, creativity, innovation and entrepreneurship are three closely-related, independent psychological macro-processes, with relationships that are yet to be defined. Historically, the *Psychology of Creativity* appeared as a discipline and a sphere of research in order to establish the role of creativity in human beings with rigor and precision (Csikszentmihalyi, 1998): etiology, characteristics, measurements, assessment, intervention and improvement. In today's academic and professional sphere, it is easy to find categorizations and systems for assessing and improving creativity, converting creativity in an essential competency for human environmental adaptation. Nevertheless, the road has yet to be marked out for the areas of innovation and entrepreneurship. Foundations must be established for the *Psychology of Innovation and Entrepreneurship* to approach its object of study.

#### *The need for the Psychology of Innovation and Entrepreneurship as an applied discipline*

A quick search using *Google Scholar* and the more common scientific databases reveals several aspects worth analyzing:

1. In a majority of publications and websites, *Innovation* refers to in its application in the field of business, from which there is an attempt to extrapolate this concept to the sphere of psychology.
2. In the case of *entrepreneurship*, its connection to the business sphere is even greater.
3. Most studies focus on relationships or specific problem areas related to the psychological component of innovation and entrepreneurship, with little attention to a discipline-wide vision of this area of study.

### *Towards a scientific definition of the Psychology of Innovation and Entrepreneurship*

This discipline's *object of study* can be referred to as the analysis of behaviors and competencies of Innovation and Entrepreneurship, in interaction with the context where they are produced, and of the psychological processes involved, using methods and techniques characteristic of the science of psychology. Frese and Rauch (2000) establish that the study of entrepreneurship is on the boundary between the psychology of work, organizational psychology and the psychology of marketing. Practically all aspects addressed by psychology are involved in the study of entrepreneurs.

There are some studies that address the topic of relationships between creativity, opportunities and innovation (Farr, Sin, & Tesluk, 2003; Mumford, 2003; Shane & Venkataraman, 2000), as well as the role of the Psychology of Entrepreneurship (Frese, 2009). In complementary fashion, there are studies of the relationships between organizational culture, the role of climate and creativity (Anderson & West, 1998; Baer, Frese, 2003; Huelshager, Anderson & Salgado, 2009; Matson, 1996). Relations between creativity and innovation as opportunity have also been the object of research interest (Baron & Ensley, 2006; DeTienne & Chandler, 2004; Shane, 2000).

Other research has focused on understanding the contextual factors of innovation and entrepreneurship (Aldrich & Martinez, 2001; Covin & Slevin, 1999; Kodithuwakku & Rosa, 2002), or on the role of personal factors in innovation and entrepreneurship, such as entrepreneurial optimism and other characteristics (Baum, Locke & Smith, 2001; Frese, 2009; Hmieleski & Baron, 2009; Rauch & Frese, 2007). As for innovation and entrepreneurial strategy, studies have defined the value and functionality of resource organizing behaviors

and the planning of competitive advantages (Terpstra & Olson, 1993; Rauch, Wiklund, Lumpkin & Frese, 2009; Winborg & Landstrom, 2000), the importance of executing a business plan, implementation, experimentation with business solutions and the competency of improvisation (Baker, Miner & Eesley, 2003; Sarasvathy, 2001; Frese, Krauss, Keith, Escher, Grabarkiewicz, Luneng, et al., 2007), the characteristics of entrepreneurial leadership and its ability to transform reality (Baum, Locke & Kirkpatrick, 1998; Ensley, Pearce & Hmieleski, 2006; Ling, Simsek, Lubatkin & Veiga, 2008) the ability to work in ambiguous situations and the hypothesis of organizational ambidexterity (Bledow, Frese, Anderson, Erez & Farr, 2009). Even the role of the family context in entrepreneurship has been investigated (Wadwa, Aggarwal, Holly & Salkever, 2009).

Ahmad (2007) presents a study that examines the relationship between entrepreneurial competencies and business success in the context of SMEs in Australia and Malaysia. A “mixed methods” approach was adopted, carrying out two studies in sequence (Study 1 and Study 2). In *Study 1*, a qualitative method was adopted, where individual interviews were held with 20 businesspeople (10 from Australia, 10 from Malaysia) who ran SMEs in the manufacturing and services sectors. The objective was to get to know the behaviors that define the competencies, and then be able to identify entrepreneurial competencies that are specific to the context and are significant in the present-day business environment. Content analysis of the interviews yielded 12 areas of competency: Strategic, Commitment, Conceptual, Opportunity, Organization, Key staff, Relationships, Learning, Technique, Ethics, Social Responsibility and Familism. It is important to note that nine of these categories are well represented in existing models of entrepreneurial competencies, offering evidence that the models offer a reasonable degree of cross-cultural generalization. However, three new categories emerged, namely, ethics, social responsibility and familism (in the broad sense of the role of the “family” in building a successful business). There were proofs of the competencies of ethical and social responsibility in data from both Australia and Malaysia, while familism was specific to data from Malaysia, and may well reflect the group orientation of the Malay culture. Identification of these additional categories suggests that some models need to be revised for better applicability to the measurement of entrepreneurial competencies in different cultural contexts.

*Study 2* (Part 1) continued with validation of the entrepreneurial competencies model. It sought to determine the psychometric rigor of the model and establish psychometric proper-

ties of all the dependent variables (measures of entrepreneurial success) and covariables (in other words, the business context and cultural background of the entrepreneurs), using a sample of 391 businesspeople from SMEs (179 Australian and 212 Malaysian). Two fit models of entrepreneurial competencies emerged — the “Comprehensive” model and the “Parsimonious” model. The *comprehensive model* revealed twelve areas of competencies to be important for the results of SME entrepreneurs in Australia and Malaysia, despite some differences in behaviors that define the organization and main domain competencies, as well as the domain of family competencies (later referred to as "Support and Cooperation" for Australia, due to the absence of family-related elements). The other 10 areas of competencies identified in the comprehensive model seem to be present for all countries. On the other hand, the *parsimonious model* of entrepreneurial competencies showed that, while some areas of competency are universal in nature (namely, Opportunity, Conceptual, Learning and Ethics), others pertain to a specific country (namely, Relationship, Social Responsibility, and Familism). It was argued that differences might be due to cultural variations between countries, especially the degree of individualism vs. collectivism. *Study 2, Part 2*, tested the causal route between entrepreneurial competencies and business success and the possible influence of covariables using a structured equations model (SEM). Results showed that the entrepreneurial competencies were better predictors of business success in SMEs, for Australia and Malaysia. It was also found that both benign and stable business contexts had a significant positive relationship with business success in Australia, whereas only a stable context was significantly associated with success in Malaysia. On the other hand, environmental variables proved to be less of a guarantee for success than were competencies. When the parsimonious model was used in model estimation, the association between entrepreneurial competencies and business success was more strongly evident in hostile and dynamic environments than in more benign and stable environments (for both Australia and Malaysia). Results also showed that cultural orientations (both collectivism and tolerance for ambiguity) have positive effects on entrepreneurial competencies in Malaysia, but not in Australia (namely, individualism and tolerance for ambiguity). The effect of education in entrepreneurial competencies was mixed: for Australia, it was significant only for the comprehensive model, but for Malaysia it was significant for both comprehensive and parsimonious models. The effects of training before and after business launch, as well as previous work experience with entrepreneurial competencies, seemed to be insignificant in both contexts. It was concluded in the thesis results that subjective perception of entrepreneurial competencies is predictive of self-reported success of SMEs in both Malaysia and Australia. The models that describe success in both countries are consistent with exist-

ing models of entrepreneurial competencies, despite country differences in behaviors that define a given domain, such as domains that successfully define a parsimonious model in each country. These results are interpreted as supporting a training program that identifies entrepreneurial abilities as an important prerequisite to business success of SMEs.

### *Synergies between innovation and entrepreneurship*

Zhao (2005) reported an empirical study of several organizations whose purpose was to help understand the complementary nature of business initiative and innovation and to develop an integrative framework of the interaction between entrepreneurial spirit and innovation. The study has a qualitative approach for exploring synergies between entrepreneurial initiative and innovation and for analyzing factors that enhance interaction between the two. Case studies of six entrepreneurial, innovative organizations were carried out, with in-depth interviews of upper management. There was also an exhaustive review of the literature on entrepreneurial initiative and innovation. The study found that: (1) entrepreneurial spirit and innovation are positively related to each other and interact so as to help an organization prosper, given that entrepreneurial initiative and innovation are complementary, and (2) a combination of the two is vital to organizational success and sustainability in today's dynamic and changing world. Entrepreneurial initiative and innovation are not limited to the initial stages of a new company, but are dynamic and integral to entrepreneurial, innovative organizations, while organizational culture and management style are crucial factors affecting the development of entrepreneurial behavior and innovation in organizations. Therefore, this investigation shows that entrepreneurial spirit and innovation must be incorporated within the ongoing, daily practice of organizations.

## **A new, emerging educational program: Education for Competency in Innovation and Entrepreneurship**

### *Competency in innovation and entrepreneurship*

The competency in innovation and entrepreneurship is already essential to today's Knowledge Society, especially with the current economic crisis, and the advent of important changes in professional and business models. Based on contributions from psychology re-

search in innovation and entrepreneurship, certain behavioral characteristics of competency in innovation and entrepreneurship can be established, as seen in Table 1.

**Table 1. Behavioral characteristics of the competency for innovation and entrepreneurship**

	<i>Competency in Innovation</i>	<i>Competency in Entrepreneurship</i>
Personal	welcoming change	self-efficacy during change
	self-regulation	resilience, overcoming failure
	openness to experience	entrepreneurial optimism
	handling emotions	handling pressure monitoring success
Social	social skills	group management skills
Cognitive	divergent thinking	thinking under uncertainty
	project creation	project application to the company
	innovative creativity	creativity for transfer
Language-related	adequate communication	information management
	persuasion	transmitting mission and vision

### *Curriculum content appropriate for innovation and entrepreneurship*

*Educating for competency in innovation and entrepreneurship* involves designing and developing teaching-learning processes – in formal, non-formal and informal contexts of the 21<sup>st</sup> century – that help toward construction, incorporation and integration of behaviors pertaining to *knowing how, being able, and wanting to innovate and launch business*. Such an effort should be based on a program of learning for innovation and entrepreneurship, whether it is considered cross-curricular or specific learning. There are several initial proposals to date (see Appendix II), and even some legislation has established substantive elements of an educational program for innovation and entrepreneurship (Junta de Andalucía, 2011). Below we suggest learning content that is appropriate to this competency:

**Table 2. Types of learning appropriate to competency in innovation and entrepreneurship**

		<i>Competency in Innovation</i>	<i>Competency in Entrepreneurship</i>
<i>Knowing</i>	Facts	About the Knowledge Society Relations betw. Science, technology, society Economic model based on ICTs	Types of businesses and companies Requirements and operation Legislation Economics Business model based on ICTs
	Concepts	Concept of innovation Inventions, registrations, patents	Concept of entrepreneurship Technology based companies, biotechnology, ICTs
	Principles	Principles of innovation	Principles of entrepreneurship
<i>Being able</i>	Skills	Applied creativity: inventions Personal autonomy skills Frustration tolerance Social skills Management of ideas ICT skills	Risk-taking Planning, design and development Frustration tolerance Social skills Resource and time management ICT skills
	Meta-skills	Personal self-regulation Inquiry and self-assessment Cognitive flexibility Divergent thinking	Personal self-regulation Inquiry and self-assessment Cognitive flexibility Convergent thinking
<i>Wanting to</i>	Attitudes	Commitment to innovation Delayed gratification Hard work	Commitment to the project Delayed gratification Competitiveness
	Values	Risk and novelty Self-critical	Risk and novelty Change
	Habits	A taste for innovation Innovation experiences Creating inventions Responsibility	A taste for entrepreneurship Entrepreneurial experiences Creating and registering activities Responsibility



*An educational model based on new content, and new, creative, innovative and entrepreneurial ways of learning*

In this new model, or educational program, teachers are not just another element, but they should become the true protagonists and leaders of change, alongside the students. Such a plan must lead to positioning the most important social capital of the educational system, its critical mass of teaching personnel, as the lever for change that will make this transformation possible. In this new panorama, teachers must provide the catalyst for entrepreneurial culture, innovation and creativity to become an integral part of the education of children, youth and adults.

For this reason, resources and specific support mechanisms should be put into place in order to prioritize talent, entrepreneurial excellence and creativity among the teachers themselves. In this new educational panorama, teachers become the most valuable resource in our society, since they are to be the leading players in change.

Equally critical is the transformation of not only educational content, but the actual methodology of teaching, which should evolve towards the capability of transmitting the new values of initiative, innovation and creativity. The only possible way is to develop and implement innovative and creative teaching methodologies. New knowledge, new skills and new values cannot be transmitted by wielding passive, uni-directional teaching methodologies.

### **Conclusions and future aims**

Entrepreneurial spirit refers to a competency that is generated within each person who makes a free, personal decision to persevere in satisfying their own motivations, moving beyond stability in order to attain better self-development, development of others and of the environment, with passion, risk-taking and sacrifice. This attitude is present in those persons who have the desire to understand their own motivations, to know who they are, what they want and where they are headed, and, strongly convinced of their achievement, they imagine, search for and generate new opportunities to satisfy those motivations. They take initiative to get ahead of changes and ahead of others, with vision for the future and value added, launching creative and innovative ideas, able to influence and integrate others in their own ideas, as well as integrate themselves in ideas developed by other people. They plan and organize re-

sources and means to carry out their initiatives, analyzing the surroundings and taking on the risks and consequences involved in an innovative idea. This person has the ability to cope with diverse situations appropriately, since they enjoy high emotional stability and strength, allowing them to quickly adapt and face problems as opportunities for improvement, reformulating and persevering until they meet their objectives, always acting on a moral level with values that respect life and liberty, improving the conditions of community life and a sense of meaning.

The future program along these lines should aim to introduce entrepreneurship as an *attitude toward life*, beyond the creation of businesses, where it becomes a key element for strengthening work teams, improving processes, and for distinguishing school and university education. However, in order to incorporate these elements in school, university, business, institutions in general and even in the family, in any sustained manner, there is a need for professionals and other people with the necessary competencies. They must be able to understand, integrate and contextualize entrepreneurship and innovation within the reality of their institutions, holding up quality and efficiency in the achievement of their objectives.

At non-university levels, it is essential to lay the foundation for competencies through early intervention programs. R&D&I Departments could play a leading role in schools, being responsible for promoting, fostering and implementing such competencies (De la Fuente, 2012; De la Fuente & Zapata, 2012). At the university level, cross-curriculum integration of competencies for innovation and entrepreneurship can already be found in many English-speaking universities. In the Spanish university context, there has been an effort to foster and to implement entrepreneurial spirit through the creation of technology-based businesses (<http://cms.ual.es/UAL/investigacion/ebts/index.htm>). Unfortunately, this reality is more evident in the classic scientific-technological areas such as industry, bioscience, aerospace, computer software, manufacturing services (Wadhwa, Freeman, & Rissing, 2008; Wadhwa, Rissing, Saxenian, & Gereffi, 2007; Wadhwa, V., Rissing, Saxenian, & Gereffi, 2007).

For this reason, Psychology and Education must not hesitate to take the leading role they ought to play in the process of personal and social construction of 21<sup>st</sup>-century entrepreneuring professionals. There is an unmatched opportunity for joining tradition (*the Psychology of Creativity*) and innovation (*the Psychology of Innovation and Entrepreneur-*

ship) in contemporary psychology (Carpintero, 2001). We should not miss this opportunity, as a science and as a profession.

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**Appendix I. How is it no one thought of this before?**







**Appendix II.** For more information:

<http://www.cipi2013.com/>

[http://ec.europa.eu/research/innovation-union/index\\_en.cfm?pg=videos](http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=videos)

<http://alfpa.upeu.edu.pe/creatividad/creatividad.htm>

<http://www.europeanprojects.org/awards>

<http://fundacioncreate.org/>

<http://www.education-psychology.com>

[http://www.juntadeandalucia.es/averroes/~emprender/index.php?option=com\\_content&task=view&id=43&Itemid=63](http://www.juntadeandalucia.es/averroes/~emprender/index.php?option=com_content&task=view&id=43&Itemid=63)

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