The education for creativity – the only student’s tool for coping with the uncertainties of the future

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Abstract

Education is – clearly – a future oriented business. And, in our rapidly changing world, the future is shrouded in clouds of uncertainty, and full of risks. Rather surprisingly, while reviewing the vast literature on topics related to education, we noticed that the concept of risk is often missing from the discussions about social policies and individual options in education. And, on the rare occasions when the risk in education is still considered, the approaches adopted are based on concepts borrowed from financial theories that create risk instead of reducing it.

This raises an ethical question for the educators: “to what extent are we – policy makers, teachers, or other professionals in education - responsible for the professional path of our students 10 or 20 years from now, knowing that it is impossible to predict the social and economic evolution even for shorter time horizons?”

In this paper we argue that the only means to provide students with some robustness against the uncertainties and risks of the future is to help them to become more creative.

In this context, we have tried to approach the problem of fostering the creativity through education from two distinct directions:

First, in the project iLab2 - Innovation Laboratories for the quality assurance of vocational education and training (Leonardo da Vinci 2012-1-PL1-LEO05-27430), we acted on the learning environment.

Then, in the project Tecrino – teaching creativity in engineering (Leonardo da Vinci 538710-LLP-1-2013-1-CY-LEONARDO-LMP), we are working to create specially designed educational content for both teachers and students, and make this content freely available through an open access e-learning platform. This paper presents a general overview and the preliminary results of these projects and suggests that – despite all critics – a reformed school remains the only efficient social instrument for promoting creativity on a large scale.

Keywords: Uncertainty, Creativity; Education; iLabs; content development

1. New people for a new world

Remember those punched cards, which - a few decades ago - were the main data storage solution in the times when the large mainframe computers ruled? A whole industry was manufacturing the machines used to punch, verify and read the cards, and many thousands of people worldwide used to make a living doing these operations. All those jobs simply vanished in just a few years, when the large mainframes shrank in size and became mini-systems, and the punched cards were abandoned. And so did the FORTRAN programming jobs. In theory, these jobs were supposed to be risk-free, as computer industry was an emerging domain. Nobody ever predicted this job market shift, just like nobody predicted other important events like financial crises, major epidemics, wars etc. We don’t know how the future will look like, yet we claim to educate our children to face its challenges. But this
“epistemic arrogance” (a term coined in Taleb, 2010) is not the only problem of our education system. The world is changing, and the education system doesn’t seem capable to keep the pace with these fast changes:

“We are shifting from an economy based on physical inputs—land, capital, and labor—to an economy based on intellectual inputs, or human creativity. [...] We will not grow our economy, we will not become more prosperous, unless we further develop all of our human creative capabilities.” (Florida, 2006).

“Today knowledge is ubiquitous, constantly changing, growing exponentially… Today knowledge is free. It’s like air, it’s like water. It’s become a commodity… There’s no competitive advantage today in knowing more than the person next to you. The world doesn’t care what you know. What the world cares about is what you can do with what you know.” (Wagner, 2012).

“Our own times are being swept away along an avalanche of innovations in science, technology, and social thought. To keep pace with these changes, we need to keep all our wits about us—literally. We must learn to be creative.” (Robinson, 2011).

“Today’s students are growing up in a world that is very different from the world of their parents and grandparents. To succeed in today’s Creative Society, students must learn to think creatively, plan systematically, analyze critically, work collaboratively, communicate clearly, design iteratively, and learn continuously. Unfortunately, most uses of technologies in schools today do not support these 21st-century learning skills. In many cases, new technologies are simply reinforcing old ways of teaching and learning.” (Resnick, 2007).

The idea to foster the creativity of the students in the educational process is not new. Back in 1965, Bruner was arguing that children should be encouraged “treat a task as a problem for which one invents an answer, rather than finding one out there in a book or on the blackboard” (Bruner, 1965). Four decades later, Scott confirmed unequivocally Bruner’s thesis and concluded that “… creativity training appears beneficial for a variety of people, not just elementary school students or the unusually gifted. Taken as a whole, these observations lead to a relatively unambiguous conclusion: Creativity training works”. (Scott et al., 2004).

Though the majority of researchers agree that the education for creativity is possible and desirable, there exist prominent opinions (see Robinson, 2011), according to which the school as institution, and the teachers as educational agents are not just unable to foster the creativity of the students, but also they seem responsible for repressing – or even annihilating it.

Thus, before thinking of the means to stimulate creativity in school, we should first try to identify the factors through which the school acts towards blocking or repressing the creativity of the students.

According to the experts (see Cachia, 2009; Parkhurst, 1999; Craft, 2003; Sternberg, 2010; Mueller 2012), the main factors that act as obstacles to an education for creativity are as follows:

- The confusion and lack of consensus regarding the definition and the assessment of creativity;
- The curriculum oriented towards quantity rather than quality of the information;
- A certain bias against creativity: teachers frequently perceive some behaviors or personality traits specific to creative students (e.g. stubbornness, hyperactivity, argumentativeness, and independence) as disruptive “misbehaviors”.
- Teachers are not trained to foster creativity of students: though most of them claim they encourage students to be creative, they simply don’t know how to do this;
- Teachers are not motivated to promote creativity;
- The lack of quality educational content for teaching creativity. Teachers and students are equally in need of such materials;
• The lack of simple and easy to use instruments for the assessment of creativity;
• The lack of IT&C tools to support teaching for creativity.

The solution, according to Ken Robinson, is to entirely transform the school: “The fact is that, given the challenges we face, education doesn’t need to be reformed — it needs to be transformed. The key to this transformation is not to standardize education, but to personalize it, to build achievement on discovering the individual talents of each child, to put students in an environment where they want to learn and where they can naturally discover their true passions.” (Robinson, 2009)

Obviously, this is not an easy task and require concurrent efforts of the researchers, decision makers, and educators of all levels.

In this context, this paper presents two initiatives aimed to identify the action directions and to make a few important steps towards fostering creativity in the technical education.

Beyond this introduction, this work is structured as follows:
- Section 2 is a brief review of the literature, in search of practical action directions to promote creativity in the educational context.
- Section 3 describes the philosophy of the “innovation laboratories”, or “iLab’s”.
- Section 4 presents the objectives of the project “Tecrino – teaching creativity in engineering”.
- Finally, section 5 is reserved for conclusion.

2. Is teaching creativity possible, after all?

In an attempt to answer this question – after reviewing some of the vast literature on this topic (Sternberg, 2010; Craft, 2003; Groth, 1999; Beghetto, 2005, Mueller, 2011; DeHaan, 2005; Handelsman, 2004; Hargreaves, 2008; DeHaan, 2009; Amabile, 1996; Amabile, 1998; Runco, 2014; Susnea, 2014) – we derived several action directions for each class of agents involved in the process: educators, researchers, and decision makers. The findings of this study are synthetically presented in the mind map depicted in figure 1.

Thus, the answer to the question in the title of this section is definitely: “Yes”. As Robert DeHaan notices in (DeHaan, 2009): “Students need to be repeatedly reminded and shown how to be creative, to integrate material across subject areas, to question their own assumptions, and to imagine other viewpoints and possibilities.” From this perspective, the education for creativity appears to be mandatory for any student in order to give him a chance to materialize his potential for a creative life.

Scott et a. (Scott, 2004) analyzed 70 courses aimed to enhance the overall creativity of students of all ages. They concluded that the instruction for creativity can be highly effective in what concerns enhancing divergent thinking, problem solving, and most importantly, problem finding, conceptual combination, and idea generation.

As Janet Hargreaves notes in (Hargreaves, 2008) one of the most important factors that block the access of the creativity in school is the apparent incompatibility between the fuzzyness of the concept of creativity and the crisp and rigid framework of the quality assessment regulations in education: “The lack of clarity of definition and measurement for creativity means that it is avoided in subject benchmarks, learning outcomes and assessment criteria and thus it is not clear where it can be built into a framework that is carefully planned, controlled and measured.”

To solve this contradiction, we must accept that – in some situations – the “right” answer we should expect from our students is “I don’t know”, or “It depends”.

In our opinion, the risks associated with introducing creativity in school ((Hargreaves, 2008) is by far less important than the benefits of creativity as the main student’s tool for coping with the uncertainties of the future.
3. The philosophy behind the innovation laboratories – iLabs

The environment (“place”) is known to be one of the four fundamental P’s of the concept of creativity. In a comprehensive literature review on the influence of the learning environment in education, Davies et al. (2013) found that the environment not only affects the attainment of students, but also the development of teachers’ professionalism.

Among other factors, they emphasized the importance of the following:

- flexible use of space and time;
- availability of appropriate materials;
- working outside the classroom/school;
- opportunities for peer collaboration;
- non-prescriptive planning

These features describe an “extraordinary space”, blatantly different from the rather dull, and highly prescriptive environment of an average school. By adding two more elements to this space, namely a set of software tools designed to facilitate communication and teamwork, and a “facilitator” we get an equation that defines an iLab:

\[ iLab = \text{Extraordinary environment} + \text{Technology} + \text{Facilitation techniques} \]
The technology involved in iLabs consists in a set of computers with multimedia peripherals and special software designed to allow anonymous participation to discussions, and easy recording of ideas.

The third term of the sum in the equation that defines an iLab, facilitation is the overall management of the resources, along with influencing the group dynamics in order to obtain the most of the group’s creative capabilities.

Historically, the concept of iLab was first introduced in 1997, by the Royal Mail’s Futures and Innovation Group in Rugby, U.K., as an aid for the management team to brainstorm future possibilities. It was later used with great success in a variety of other purposes such as: strategy planning, summer schools, focus groups, staff development etc.

Building an iLab at the Department of Computer and Information Technology of the University “Dunarea de Jos” of Galati within the project "iLab2 - Innovation Laboratories for the quality assurance of vocational education and training” is the first step in a multi tier plan aiming to create long term facilities for an education for creativity.

4. Towards a textbook of creativity

The project “TECRINO- Teaching Creativity in Engineering” primarily aims to create comprehensive educational content for teaching creativity, and make it freely available in 7 EU languages (Croatian, English, Greek, Polish, Portuguese, Romanian, and Spanish) by means of a dedicated e-learning platform.

The project will approach the problem of the education for creativity from both the perspectives of the teachers, and students. This will result in two distinct courses for educators and learners, both sharing the same practical methodology of learning by examples. Just like the creator of TRIZ, Genrich Altshuller analyzed over 40,000 patents in search of patterns of creative thinking, and distilled these patterns in just 40 principles of TRIZ, the Tecrino courseware will provide students with a wealth of examples of creative products and ideas from various domains (visual arts, science and technology, literature, etc.) with the intention to offer them the opportunity to re-discover the principles of inventive problem solving.

The courses will cover most of the existing techniques for stimulating individual or group creativity, and will also present some IT&C tools known as creativity aid. A special chapter will present the main steps for writing and filing a patent application.

To conclude, Tecrino fills a knowledge gap by creating comprehensive and free educational content for teaching creativity.

Conclusions

The education for creativity is not just a moral duty, but also tends to become a stringent necessity of the modern school, as it is obvious that creativity is the only instrument that enables today’s students to cope with the uncertainties of the future.

Though intensely criticized for killing the innate creativity of the students, a reformed School seems to remain the only institution capable to promote creativity on a large scale.

The modest attainment of the authors through the two Leonardo da Vinci projects demonstrate that something can be done in this direction.

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