

# Educating Creativity – Experiences from the International Summer University on Creativity Engineering

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## **Abstract**

Creativity is an essential source for new ideas, new achievements and innovation. It is thus surprising that training of creativity is insufficient in schools and universities. While students and graduates often have good business ideas, many of those are doomed to failure. The reason is often the insufficient awareness of the process of how ideas can be implemented successfully. To address this obstacle, the authors have organized the international summer school on creativity engineering to complement the syllabus in universities. Following its slogan “From a creative idea to its successful implementation” participants were trained to understand individual creativity, creativity in teams and creativity in organizations in order to follow the process from shaping a raw idea to one with potential for real implementation. This paper shares the experiences gained with the participants and through such a training program in universities.

**Keywords:** *Business model, Human traits, Innovation*

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## **1. Introduction**

The last decades have seen creativity become the subject of rigorous scientific interest, after the work of Guilford. Even if this arena does not fall for a common definition, there are some strong points of agreement: A solely original idea does not necessarily mean a creative one; for an idea to be creative, it must also be appropriate for the problem at hand. Some other literature adds the parameter surprisingness, out of a very interesting phenomenon: when seeing or having a creative idea, people tend to feel motivated and encouraged to continue exploring it. Not surprisingly Maslow pointed out creativity as representative of autorealization.

Creativity is a critical skill in almost any discipline; it is the source of new ideas and visions which can lead to new achievements and to innovation. It is thus surprising that the training of this essential skill is shortcoming in universities. Handling algorithms, methods or computer systems is given priority. While many students develop interesting ideas during their study, they often have no clear plan of how their ideas can be realized and implemented. The process of picking an idea to developing it to an innovative business solution is a complex one, requiring interdisciplinary thinking and crossdisciplinary acting. There is much potential in combining training in creativity with developing business ideas.

To train and support students through the process starting from developing a creative idea to its successful implementation, the International Summer University on Creativity Engineering (ISUCE) has been launched. This paper presents the conceptual development, results and output of the ISUCE.

## **2. State of the Art**

Training students in the development of creative ideas covers a wide series of disciplines and grounds, i.e. there are many samples of creativity used as a vague and ambiguous term. Even in the scientific arena, it can be a matter of discussion. Nevertheless, most authors agree on some basic terms: creativity involves the generation of ideas that are novel and appropriate. The object of such creativity, or “what is creative”, has a higher level of disagreement. One can find descriptions of:

- Creative individuals, or individuals that create many, varied or good ideas. At this level, one can distinguish between those that create substantially remarkable ideas, and those that create ideas that are original and suitable for small problems at hand.
- Teams that create many, varied or good ideas (more than each of their members). Creativity techniques are focused mainly – although not exclusively – in this area.

- Creative ideas, that are ideas that are themselves novel and appropriate.
- Creative environments, or those who foster in their dwellers the creation of new and good ideas.
- Creativity-fostering institutions, by different means, activities, training or promotion.
- Creative processes, or those that deliver in a person creative ideas.

At individual level, a high amount of methods and techniques have been developed, and correlation with different factors have been sought. These methods have mainly arisen from the discipline of psychology.

One of the very important pairings is that between creativity and intelligence. Which is part of which? Guilford's structure of intellect model sees creativity as a part of intelligence, mainly in divergent production (Guilford, 1950). Sensitivity to a problem, fluency and flexibility have a strong link as well. Some other authors such as Sternberg and Lubart (Sternberg & Lubart, 1991) go even beyond, seeing intelligence itself as a subset of creativity: creative people have abilities that others do not. It combines intelligence with more attitudinal and environmental factors. The fact is that highly creative people tend to have above-average IQs (Cox, 1926), making it relevant to understand one's own intelligence for the exercise of creativity.

Another critical factor is personality. Every person has the potential to be creative, and many researchers have seen creativity as a trait of one's personality. Other people speak about creative personalities, as that of someone who is consistently creative. But both terms only started to be paired in the research arena in the early 1980's, where Barron (Barron, 1981) started relating it to aesthetic sensitivity, broad interests, attraction to complexity, independence of judgement, intuition, high energy level, self-confidence and creative self-concept. Later Feist (Feist, 1998) described them as autonomous, introverted, open to new experiences, norm-doubting, self-confident, self-accepting, driven, ambitious, dominant, hostile, and impulsive. In Goldberg's Big Five (Goldberg, 1990), the traits of extraversion and openness to experience seem to have a particular relevance. Understanding such concepts is important for people that expect to perform with creative requirements.

In a broader sense, it is important not only to understand creativity, intelligence and personality from an introspective point of view. If a creative idea is to be put to place by a multidisciplinary team, it is important to analyze other people's creativity. In this regard, the concepts of team dynamics, interaction, and team management is critical. Even with different levels of creativity, a convenient knowledge of the roles that different people have in a team determines the success of the whole team. Sometimes one's role might not be generating that groundbreaking idea, but success can be ensured by a convenient balance or team roles.

Belbin's (1993) model is particularly useful in situations like the aforementioned one and being able to ensure that everybody is performing at their best potential can depend on having been trained in this.

Being able to guide a team through the process, by having a clear process and mental structure, can also be critical in the idea development process. Concepts like being able to precisely set the goals and scope of what is expected to be solved, or to be able to adapt it when required, can be a very valuable asset. As much as in competences for project managers, creativity is considered critical (Caupin et al., 2006), the development of such a creative idea requires of knowledge on how to structure its development, how to parcel the problem in others that are feasible to solve, or how to understand the stakeholders or the risks in that project.

Defining that scope, and how that outcome is to look like, is as well a challenge in itself. Creativity sessions deliver raw ideas. In order to turn them into tangible business solutions, additional factors need to be considered. Osterwalder (2010) developed an ontology of topics to develop in order to do so, and further structured them as what is known as the Business Model Canvas. The canvas holds nine topics that need to be discussed in depth, in order to completely define a business model. By analyzing the value proposition, who the customer is, how is the relationship with that customer, through which channels the company communicates with it, the key activities, the key resources, the partners in the venture, the revenue streams and the costs associated to it, the model is fully developed. For that matter, understanding such a model can allow to materialize the concept into a business-wise idea, which otherwise may only work in one or a few of those areas.

Another important topic related to the training in the development of a creative idea is how to create a creative environment. How should the company look like for the development of ideas in a more systematic way. An idea can become a successful business, if the environment is right. For the entrepreneurial area, one can generate such a positive environment, but if innovation is to be sustained, mechanisms need to be put to place. Workers need to have space for new creation, and need to have the possibility of taking risks themselves. Allocating time to such activities tends to be a good policy, as well as opening this policy to as many people as possible. Otherwise, the person is not encouraged to generate new game-changing ideas, or never gets the chance to develop them (Brand, 1998, Tonnensen, 2005)

### **3. Methodology: scheme of ISUCE**

From the point where an idea is born to the point where the idea is prepared for implementation, the environmental setting is changing. The environmental setting for the birth of an idea is an individual person or a group of individual people. Different creativity methods may stimulate the generation of ideas. So do different human traits and the psychological settings in an individual. It is thus an important concern during the ISUCE to address those human traits that play a role in the creative performance of an individual.

Studies of creativity are mainly framed in the discipline of psychology, and much of our understanding comes from other insights gained in this field. At the end of the day, a creative person is a person and a creative behavior is a behavior. And they all have mental processes behind them. The processes of vertical and lateral thinking relate much to the concepts of conscious and unconscious. Creativity seems to fall, after evidence on the process, on this second level of behaviors, of which we are not fully aware. In particular, traits of a person can strongly influence the way they come up with new solutions. Differences in intelligence may have an obvious influence on the patterns that the person has been capable of developing. Personality traits as to how problems affect us – and how we affect problems – may also.

The first part of the ISUCE was therefore focusing on aspects of intelligence, personality and creativity in an individual. In this part of the course, it was aimed to make “creativity” more tangible for the participants by exploring what creativity is from a psychological point of view and how an individual is creative.

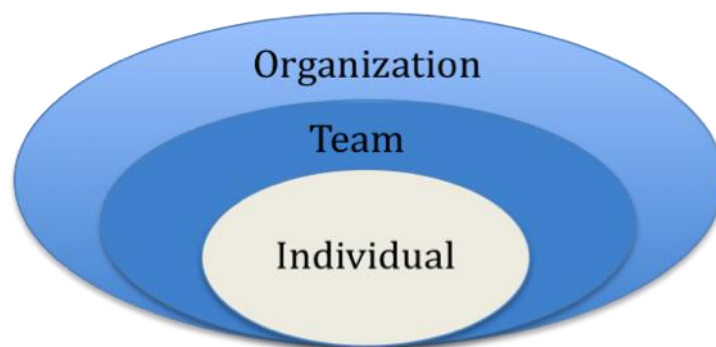
As one can imagine, the performance of a creative individual in a working group or a team may differ from the individual’s performance. Even if many creative individuals have to work together, group dynamic effects or the obligation to work in interdisciplinary and intercultural teams may influence the performance of each individual and the team as such.

In the second part of the course, the aspect of creativity was discussed with regard to team effects. In this part of the course, participants were informed that they need to work in groups to develop an idea and present it at the end of the course.

As a third pillar of the contents, a team must be understood as a subset of a bigger community. Only the teamworking moments may not be sufficient to ensure that the project gets to an innovative outcome on the longer run. Company day-to-day business, corporate policies, or excessive rigidity at preliminary levels can kill the creative long-term outcomes of a group. For that matter, the ISUCE ended with a section on creativity at corporate level: how to foster

and manage it. An external innovation manager showed the processes in his company, and how creativity is incentivized. This session was topped up with another on creative environments, business plan development, etc. The purpose was double: to teach the participants how to create a more creative environment in their potential future companies, and to leave the space for a creative environment itself.

The structure proposed here comes from an analysis of the different objects in the study of creativity. As was seen in section 2, the word “creativity” can apply to many different objects. For the purpose of the ISUCE, the following scheme was used:



**Figure 1. Topical focus of ISUCE**

The ISUCE was structured following this approach. The first topics to be introduced focused on creativity at an individual level, to let the students gain understanding of the mechanisms that were happening, and how to trigger them. They were trained in different techniques to foster individual creativity, by using random or selected cues, suspending judgement, engaging in interaction patterns, etc. They were further brought to team dynamics, by the use of different creativity techniques. A strong stress was made between the Six Thinking Hats technique (de Bono, 1985) and team roles. Project management concepts were as well brought up, to help them structure the problem and the discussion. Facilitation techniques were also explored. Finally, the last sessions focused on innovation processes in a broader way, and were interlaced with further project management and innovation management methods and concepts.

An important element of ISUCE was that each one of the teams formed was expected to develop a complete business, out of scratch. They were coached through the process of finding a problem they wanted to solve, defining it as a more specific target, analyzing their environment to understand the problematics, and what has been done, generate ideas and iterate on the concepts, structure them in the shape of a business, and understand how it should be implemented. The process that was suggested, and the table of contents for their results, was the following:

- Target-setting.
- Environmental analysis.
- State of the art.
- Idea generation.
- Conceptualization of the business.
- Risk assessment.
- Closure and further steps.

Of course, the previous structure did not intend to imply that ideas would only be generated at a central point of the process. Rather the generation of ideas was encouraged during the whole process, and for each one of the aspects. The generation and analysis of ideas was centralized for documenting purposes.

In addition, since the ISUCE had such an entrepreneur-oriented approach – and to encourage this spirit of executing ideas – Fridays were defined as “Venture Day”, and dedicated to activities directly related to starting up one’s own business. There were sessions on business development, talks from entrepreneurs or people related to the field, and the last day the students had to pitch their idea and sell it. For that, they were as well instructed in presentation skills, tricks and techniques.

#### **4. Results: the projects developed**

The different projects developed showed the results of the creativity of students from ISUCE. One interesting reading about this projects is what they constitute in the students minds: they constitute a vision of the future, a grasp of where they see the current world heading and where they would like to contribute. And all of them focused on improving the life of people, and in many cases in letting them grasp the power of their creativity. The most important part when reflecting about this fact is the value proposition of each one of the projects, and the link all of them have with creativity. One can see through this how the students see the importance of creativity in the day-to-day life of society.

And what could be more representative of the future than children? Two of the five projects developed during the last course pointed at them, and most particularly at looking at ways of developing their creativity. Be it as a consultancy service for schools and other associations, or as a physical space where kids exercise their creative potential, the clear issue is that current education lacks – in many countries – of a strong exercise of creative abilities. A physical time and space for children to exercise their creativity through games, and in their free time, is something that has drawn the attention of students as an immediate need.

But staying only in the realm of children would entail results being visible only in some 10 to 20 years! Two of the groups took an approach oriented to adults, by effecting their working procedures. One of the group focused on the workplace, creating an environment in which companies can benefit of a more creative and sharing environment. Another one of the groups created a platform by which small and medium-sized companies can connect with university students and environments, to get their problems solved giving them a practical application of their knowledge.

Finally, a more direct approach can be taken in the development of a product. And so did another one of the groups, challenging the creative arts in envisaging a new way of making music – or an analogous artistic experience – by devising a way of creating a music track out of vibration. The initial intention is to get deaf people to get to enjoy music, but this project could create a new art form of its own right.

All these projects are the result of three weeks of intense lectures, workshops and hard work on the student's side. All projects were published in a book and were handed to the participants. This effort had some positive effects: For most participants, their contribution to the book constituted their first official, international publication. At the same time, they had a well developed document of their ideas and business concept at hand that would serve as a good basis for developing a business plan. . However, documenting a project is the first step to making it happen, to turning it into a reality. For some participants, the project developed in the course was the initial point to start looking for funds for the implementation of their projects.

The last step in the course was a reflection session on how the participants perceived the course, what were the lessons learned and what they want to do with the insight and knowledge they have gained. Each participant was asked to write a contract with himself to be fulfilled in a scope of one year. There was no need to read out loud the content of the contract, nevertheless, some did. The contract should ensure a sustainable binding between the participants themselves and between the participants and the course coaches. After a year, the coaches were obligated to send a reminder whether they succeeded to fulfill their contract.

## **5. Discussion, conclusions and further steps**

The feedback received from the participants indicate that the ISUCE course was perceived very positively. All participants agreed that they need to learn more and get more detailed insight into the topics discussed in the course. Four out of six participants that were



professionals in companies quit their jobs and started to study again after the course. Some of the feedback received in this context were:

“In the last few days I have been delighted with my new knowledge about the fantastic concept of design thinking. I convinced a school "juri" of my motivations to study, and now I have to explain what is "Design" to my parents... that is going to be hard!”.

“For me the essence is the recognition of our minds potential, what can be blocking it and specially how to unblock it! Of course the cultural diversity only makes this experience more rich and wide! And funny too by the way...”

For many students, the ISUCE was the first experience to work in a culturally diverse environment. For two participants it was even their first time abroad. It is clear that a creative performance can not be fully trained in the scope of a three week course. However, the fact that it can be trained and not solely an inherited trait, is also obvious. To maintain the contact with the participants and to coach them after the course, special groups were formed in existing social media platforms. Further, follow-up workshops and seminars are planned to refresh the contents and detail topics that are of particular interest of the participants.

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