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Designing a creativity training plan for companies

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***Abstract**: It is widely recognized that training in creative techniques enhances competitiveness and efficiency of the company production process. Relying on the idea that creativity is the basis for innovation, to learn and manage creativity techniques becomes strategic to meet a company's need for innovation. Hollanders and van Cruysen's system of indicators (2009), based on the European Innovation Scoreboard (EIS), is aimed at quantifying creativity and design, and the role of professional training is key for a company's success on the market. This paper presents a methodology for drafting a training plan for companies. The methodology counts on two approaches similar in structure but different in outcome, both able to meet a company's specific needs. The first approach considers innovation enhancement based on a company's ability to be creative (IDEActivity). This approach relies on co-design and it aims at teaching how to shape creativity tools in an independent way. The second approach is centred on CPS (Creative Problem Solving) aims at enabling people to work creatively both individually and in teams. It aims at training the employees' ability to generate innovative solutions. The methodology presented in the paper aims at: enhancing creative collaboration; teaching techniques tools; coaching companies using hands-on workshops in order to promote the use of methodologies and techniques for innovation.*

Keywords: Creativity, methodology, creativity tools, innovation

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Why it is important to learn how to be creative

The future of the economy and society is becoming more and more influenced by creativity and by the ability to produce ideas, knowledge and innovations. This ability has always been important, but in the last twenty years has literally exploded.

Creativity, other than contributing to self-fulfilment, is one of the primary sources of innovation, which is recognized as one of the main driving forces underneath sustainable economic development (Bessant, Whyte and Neely, 2005). This driving force is fundamental to the creation of companies able to enhance Europe's competitive edge on an international level. People with their intelligence, knowledge and ability of being creative are the centre of attention of this innovation system. The need of a new entrepreneurial culture capable of stimulating, encouraging and fostering the possibility of development of individual and group abilities emerges as an inspiration for new innovating strategies (Amabile, 1998).

When we talk about innovation in the industrial field, we mean a change that is not only generating improvements, cost optimization, turnover, and better performances, but is also developing competitiveness. Every change is in itself an innovation. In a company, changes become innovation (technological, strategic, of the product, manufacturing, cultural and so on…) when market competition increases.

Craft (2005) sees innovation as the "implementation of new ideas to create something of value, proven through its uptake in marketplace. An innovation can be seen as a new idea being launched on the market for the first time". However, innovation without creative ideas does not exist. On the contrary, creativity is at the basis of innovation (West, 2002). They are complementary, and we can say that creativity is not only the source of innovative process, not just an input for innovation, but it is the environment where the innovative process can easily develop (Shani and Divyapriya, 2011). Creativity is the context, and the reference frame where innovation can develop in a sort of humus and rich soil in order to be fostered and spread (Swann and Birke, 2005).

The spectrum of what we can achieve with creativity is broad. Creativity can simply renew the products or achieve much more relevant results, such as the creation of new product lines and/or the creation of new companies.

It is generally accepted that creativity in a business strategy becomes the means to face the complexity and dynamics of the economic context, and to beat the competition.

If we face a problem using a rational approach we achieve correct results, but traditional logic models always limit these results. When we require a different and innovating solution we have to change the reasoning scheme and see things in a different perspective. We have to abandon vertical thinking, the one based on logic deduction, to embrace the creativity of lateral thinking (De Bono, 1990).

In relation to the above, everyone can be creative, so creativity can be studied and developed using tested techniques and experiments to stimulate creative abilities.

In general, a creative environment in a company is fundamental to build a new relationship among creativity, design and innovation in order to satisfy the need of competitiveness and innovation in a new way. Creativity is actually in a direct relationship with design and design is in a direct relationship with innovation.

Co-design activities together with a *learning by doing* approach are used to tailor a training plan able to both adapt to the specific company's needs and to increase the

awareness and the ability to use methodologies and techniques for innovation inside the company.

Companies among creativity, design and innovation

Creativity and design are elusive and overlapping concepts. This in part explains why their treatment in analysis and policy is less developed than that of more tangible issues, like capital investment. Although creativity is recognised as vital to business success it is the more science and technology based channels of creative input, such as R&D. “Design is what links creativity and innovation. It shapes ideas to become practical and attractive propositions for users or customers. Design may be described as creativity deployed to a specific end”. (Bitard and Basset, 2008)

Creativity means: the ability to create new ideas and it is preliminary to the act of innovating. Creativity (mental phenomenon) always anticipates innovation (economic, social and cultural phenomenon) generating ideas that once communicated shared and adopted by the community, develops innovation.

Creativity and innovation are related to the process of creation and application of new knowledge, and have a real impact on the ways of doing business. “Creativity and innovation are considered to be overlapping constructs between two stages of the creative process; both are necessary for successful enterprise” (Martins & Terblanche, 2003).

The word “creativity” is often confused with the word “innovation” and vice-versa, but there are basic differences between the two terms.

Creativity might be defined according to Amabile as “the production of novel and useful ideas (Amabile, 1996) while innovation might be defined as its implementation phase, the transformation of a new idea into a new product or service, or an improvement in organization or process” (Heye, 2006).

Gurteen (1998) defines creativity as “the generation of ideas” and innovation as the transformation of the ideas into action through a selection, an improvement and an implementation. Vicari and Trolio (2000) have the same idea and affirm that creativity is the input while innovation the output and analyses the influence of creativity in management. The management, through a conscious leadership, needs to understand and direct the different and numerous contributions coming from the employees. Both in managerial and more operational activities it is important to detect people’s preferences and potential in order to enhance their proactive role in the company.

As a consequence, the decision making process, usually the responsibility of the managers, might be carried out with different forms of collaboration with the employees. In order to innovate, relying on their own internal potential and abilities, companies need to understand the value of this kind of participative managerial approach. This approach needs to be one of the firm objectives, wanted and supported by the management, together with the strategic objectives of enhancement and implementation of employees’ potential creativity. Innovation built on people’s knowledge and abilities might be much more relevant than technological innovation or product innovation.

Most of the techniques used today as creativity support are mainly based on the concepts of knowledge, knowledge sharing and knowledge management. The objectives of the techniques and tools used aim at promoting and generating creativity, thinking outside the box, stimulating imaginations and improving the conditions where

creative idea is produced. It is necessary to work on the entrepreneurial culture on its whole, making the effort to provide new approaches and tools for the enhancement of in-house creativity and creative problem solving.

In order to generate innovation or innovative solutions becomes crucial to well define the problem and to clarify the main objectives/aims before proceeding to the generation of the possible solutions. Creativity or creative problem solving don't necessarily need to be used for any kind of problem/decision. For programmed decisions, which are iterative and well defined, there are consolidated procedures in every firm, while for non-programmed decisions there are not systemized criteria or standards. It is on this last kind of situation that managers need to focus due to the quick shifts of the market. This circumstance induces to reconsider the rational perspective, which is typical of the sequential or linear reasoning, to undertake the decisions in a more flexible and not pre-defined way.

Intuition, creativity and experience end up being the main elements that allow us to identify the problems and the search for solutions. The collaborating dimension leads to the development of the value of the "human asset" on the condition of giving its contribution to entrepreneurial growth, accepting the fact that an innovation might not necessarily come from high management.

In this sense, new techniques to stimulate creativity can be used in every area of the firm: strategic planning, business strategy, product development, services optimization, functional strategy, finance, human resources, marketing, information managements, quality management.

Objectives of the educational process

In order for companies to remain competitive and to further broaden their markets they need to understand the role of creativity and learn how to manage their own. It becomes strategically important for them to identify and foster conditions in able to create a work environment where creativity thrives and is enhanced as a long lasting process, rather then a quick way to address immediate issues. Innovation in an organization is significantly influenced by components characterizing its employees, the creativity-relevant skills and processes and the intrinsic motivation and by the environment in which the employees work (Amabile 2012). These creativity-relevant skills can be developed, sustained, and enhanced through formal and informal mechanisms such as training and education (Amabile 1988).

An important dimension of creativity relates to the relevance given to knowledge, knowledge sharing and knowledge management. Knowledge might be individual or shared at group or organizational levels and have implications within the whole creative process. It becomes an important factor for the transformation of ideas into value and is to be considered in the context of creativity for innovation. Creativity can be learned and developed using tested techniques to help people to get out of their usual analysis patterns, facilitating the consideration of wide scope alternatives to improve productivity and quality of work. Nussbaum shows that creativity is learned behaviour that gets better with training, like sports. People can make creativity routine and a regular part of their lives. "That's true for big companies as well as small startups, corporate managers as well as entrepreneurs. Creativity is scalable". (Nussbaum, 2013)

The foundations of the research are focused on the creative process while the applied research is developed on two different methods (Creative Problem Solving – CPS and IDEActivity) and is focused on how environments and personal attitudes might

be able to foster or inhibit creativity in a work context. According to Amabile's latest theories on creativity, we are working on the four necessary components enabling creative responses: three components within the individual (domain-relevant skills, creativity-relevant processes and intrinsic task motivation) and one component outside the individual (the social environment in which the individual is working).

Considering the above, the aim is to create a methodology built on two different creative approaches. One is more structured based on both personal attitudes (using the Foursight approach) and divergent and convergent thinking (CPS – Creative Problem Solving) and one is more hands-on (IDEActivity).

The principal objectives of the methods used are different and can be summed up as follows:

- raising companies awareness of the importance of enhancing creative work environments as a basis for innovation;
- understanding, managing and developing tools able to foster creativity and support the process of idea generation;
- testing and validating the methodology proposed with theoretical and practical sessions assisting each phase of the whole creative process;
- defining new professional training procedures, contents or methods.
- structure and encourage the creation of "creative labs" to be set up as collaborative/conceptual spaces able to support the generation of ideas and be catalyst of otherwise unexpressed thoughts.

This last objective aims at stimulating an "ongoing creative attitude" of all the employees through the creation of a collaborative environment for innovation. The space then becomes a tool.

The structure of the educational process on creativity, which is organized into actions, is flexible and adaptable to the needs of each individual firm where it may be implemented; macro and micro objectives are nevertheless left unchanged.

What our research group is trying to do is to strengthen the firms' creative behaviour/creative thinking with its educational plan. This means allowing a "way of thinking" to settle in individuals as a consolidated behaviour and to facilitate creative thinking in groups. Main points in the training remain such micro-objective as:

- *inhibiting factors for creative thinking:* recognize, face and overcome creativity blocks;
- *identification of potential:* development areas of creativity at individual level and within the organization (fluidity, flexibility, originality and production);
- *exercise techniques that favour creative thinking and therefore behaviour:* techniques for the development of creative tactics and strategies (with Tactic Creativity we refer to original and relevant answers to medium difficulty problems, with Strategic Creativity we refer to the process of advanced creative research when facing high difficulty problems).

It is possible to appreciate the methodology proposed as a complete path to structure a training course for companies. The structure of the methodology highlights what are known as the 4Ps (Person, Processes, Products and Press) in Rhodes model (2012). The 4Ps are identified in the characteristics of Persons creative nature, the Processes they might use, the Products (or outcome) resulting from their efforts, and the Press (or environment) that fosters or inhibits their creativity.

The aim of our methodology is to engage the participants in being active in the creation of knowledge and knowledge sharing, and to make them shift from being consumers of creativity to being generative creativity protagonists. “To encourage creativity, we need to let them experience the creativity process in which possibilities are made in reality” (Atkinson 2011).

Creativity as an educational process

The path to a company’s innovation development is connected to the improvement of their production processes through training/intervention Actions (see page 5) aimed at the acquisition and employment of competences of creative problem solving and creativity. The training plan is structured on the base of an innovation program developed by the Politecnico di Milano, starting from needs and requirements expressed by the companies. Methods, instruments and techniques highlighted in the plan are capable of generating innovation, and they can be implemented in every step of the production process as well as in the final product. More specifically, they can be implemented in the production and manufacturing of the product by analysing the impact of every phase of the process. Furthermore they can be used in the idea generation, design and development phases of a new product as a support to both technical and organizational requirements. From the analysis of the firms’ needs we can deduce that it is necessary to abandon fixed processes, to stimulate imagination, and regardless of the method to improve the conditions under which an idea is produced. We decided to adopt a process that could be easily implemented in different environments. The aim is to contribute to the development of creativity and innovation abilities of a firm, through a pragmatic approach able to demonstrate how every step of the process can be reshaped according to the context. In particular, the training plan deals with two complementary macro areas:

- the first deals with the innovation development process through the firms' ability to be creative. It relies on co-design experiences designed to enhance creative awareness and abilities, using methods and techniques aimed at creating a competitive advantage via creativity (**IDEActivity**);
- the second is centred on a method, Creative Problem Solving (CPS), aimed at strengthening the ability to find innovative solution to problems and enabling both individual and teams to be creative in an effective way.

The planned innovation process will be implemented via a dual methodological approach:

- a first approach aims at detecting the training needs of the firms. It is set in a sharing environment where everyone is free to express his opinions. In particular, will be carried out activities to acquire competences and abilities in creativity and creative problem solving;
- a second approach aims at tailoring the interventions to the specific needs of each firm through a direct link to their real daily activities (firm mode). In particular, direct interventions will be carried out in relation to firms’ real problems and activities using a learning by doing approach.

The training plan is composed of 4 Actions:

Action 1. Lecture: general introduction of the method and presentation of the training plan.

Action 2. Audit finalized to the mapping of expectations, guidelines, critical points, needs by individual and organization as a whole.

Action 3. Detailed outline of the program for the development of innovation in terms of specific areas of intervention, objectives and expected results.

Action 4. General training on methods, models and techniques for creativity, based on collaboration and the use of Creative Problem Solving, IDEActivity and Gamestorming: Leadership and Creative Team Building; Advanced Techniques; Definition and implementation of techniques on specific products as required by objectives and work team involved.

Each Action has a specific objective while contributing to the general structure of this new and effective training tool. In this paper we will not describe each training action in detail, but we will focus on describing the structure as a whole and the relationships between the Actions.

During the preparation phase of the training plan we conducted a demand analysis with the intention to identify the training needs of local firms. The analysis was used to tailor the programs and design in detail every training intervention.

Method and instruments of the training plan

The lecture mentioned in Action 1 is aimed at describing the fundamental methods that will be used, their goals and underlying logic. The goal of this first Action is to clarify the concept of creativity in association to innovation and underlining the value of creativity tools in a business-oriented environment.

The phases will follow this order:

Preliminary definition of creativity at individual and organizational level; description of relationships between creativity and innovation; definition of creativity as an evolutionary process; description of creativity's typical dichotomies; introduction to the main techniques that will be used during the different phases of the training plan.

We then precede in Action 2 to register in detail the needs of the firms in order to create a training program as specific as possible. The needs assessment will be carried out during the Audit using different data acquisition techniques. This will include the participation of the firms' employees and will see individual, teams and collective activities.

From the available studies it is clear that a unique model to evaluate/measure a firm's creativity does not exist. Since every firm has its own defining characteristics, it is necessary to evaluate creativity in different ways according to the type of organization. Our methodology uses different techniques, in some the participants are actively involved and others are based on observation of individual and/or group dynamics.

The goal of Action 2 is to gather information on the competence, interest and use of creativity on individual, group and whole firm levels, considering as well previous competencies, needs, desires and requirements of the participants both individually and as part of the firm. Theory, and some empirical evidence, suggest that when people experience positive interaction, lower levels of stress, and feel valued, they are more likely to engage in creative behaviours, generate creative ideas, and solve problems creatively (Fredrickson, 2001; Cohen-Meiter, Carmeli & Waldman, 2009). When employees feel a deeper sense of engagement and experience a climate conducive to creativity, numerous business benefits result, including higher levels of innovation (Harter, Schmidt & Keyes, 2002; Vincent, Bharadwaj & Challagalla, 2004).

The needs assessment will be carried out through surveys, mind maps, word-storming and focus groups in order to map data and information about the current level of competences and opinions of the employees in terms of creativity and innovation applied to product development processes.

The starting idea is to answer the following questions though non-directive techniques to obtain qualitative data:

What do they know? What do they expect? What would they like to know? What do they fear, what do they not want?

The goals of creativity evaluation through different techniques are:

- analyse creativity and innovation within the firms;
- understand the crucial role of the key factors that impact individual and group creativity;
- find parameters and scales to quantify and measure the level of creativity in the firms;
- study the data do identify the main critical areas;
- submit the training plan to improve work creativity.

Several research programmes concerning the creative climate have used questionnaires with rating scales for valuing companies' members' perceptions of climate conditions. Often, the company internal climate has been considered 'objectivistic' (Ekvall, 1987), an intrinsic reality of the company where recurrent patterns of behaviour, attitudes and feelings are what characterize its life. The rating scales aggregation of values, usually mean scores of the climate dimensions identified, allow for the measurement of climate (Isaksen and Ekvall, 2010).

In Action 2 datas are collected in two different ways:

- a first "emotional" way, with a dominant graphic component that creates an expressing mood in order to represent a photo that emerges directly from the participants through Give&Take maps, word-storming and mind maps;
- a second "critique" way: it is developed from key words/areas emerged from the data, the surveys, the focus groups (such as space, time, techniques&instruments, daily activities and so on) and from the assessment activities.

The maps allow collecting information on the concepts of creative thinking and creativity in relationship with innovation, taking into consideration perceptions from individuals, groups and the whole firm.

Give&Take in particular allows gathering individual and group information while highlighting how the preferences and specific abilities of each person might contribute to the group, the class and the firm. The process of what emerges from this instrument leads to the creation of a "flower map" in which no petal/topic has a priority over the others. The analysis of what spontaneously emerged from the participants is followed then by a categorization of the terms through a convergence phase carried out by the research team.

Previous experience shows it was possible to determine that the words expressed on impulse by the participants can be easily tracked to creativites fundamental parameters: breaking of consolidated schemes, improved creativity, apply creativity on the job and so on. The "flower map" created from the parameters emerged from the activity Give&Take is then used as a layout for the processing of the focus map.

Word-storming is an instrument characterized by a series of evoking moments on creativity. It is based on the human mind capacity of associating concepts and information in non-linear patterns. Through an immediate and fast diverging phase it is

possible to overcome an initial judgmental phase and dive into the perception of creativity. Suspension of judgment leads to completely new and unexpected connections. Word-storming is also a perfect instrument to introduce the idea that creativity is the union of two important moments, divergence and convergence.

The idea that "divergence alone is not creativity" is highlighted again in the return phase when the words are displayed graphically in order to underline the importance of the divergence phase (many new concepts) in relation with its elaboration and consequential convergence phase. The convergence phase is consolidated with a group activity, leading to the production of a poster representing the meaning of creativity.

After this, during the Audit, we proceed using two interconnected instruments: the Focus Group and the Mind Maps. During the Focus Group people are invited to speak, discuss and confront, expressing their opinions freely on a specific topic emerged previously during the earlier maps.

The Focus Group is visualized in a branched mind map where the main idea, CREATIVITY, is represented in the centre and connected to its related concepts via hierarchical branches. The ideas documented in the map are divided using different colours for the main branches (Firm, Innovation, Context and Environment, etc.). The principal braches have darker colours while the smaller branches have progressively lighter colours. The use of colour provides a new dimension of the information and helps the brain interpret the data in a more efficient way.

Then a new map is made through the overlapping of the areas of interest on which the training will be focused. Such a map is created on the basis of the "petals" from the Give&Take, redistributed in a way to make them overlap the main branches of the Focus Map, allowing for a cross processing of the emerged information in order to better define the training program.

Figure 1. "Flower map" and graphic representation of its overlapping with the main branches of the Focus Map.

The instrument that allows for the collection of quantitative data is the survey, structured in four sections respectively dealing with:

- what creativity and innovation mean for the firm's employees;
- how the firm encourages creativity and innovation from the internal employees point of view;
- how the firm has structured the development process of new products/services from the internal employees point of view;

- which tools for the approach to creativity do the employees know and/or use.

From the information and data emerged from the surveys we proceed to focus the employees' view on the covered topics with the goal of verifying their perception in terms of feasibility, moments/spaces for internal discussion for development and cross diffusion of innovation.

The final assessment allows continuing the direct observation of the group during the activity. We proceed with grids of different dimensions (Environment/Behaviour/Sharing) and observe what the participants do, how they organize themselves, how they deal with the problem and how they react to the solutions proposed by other participants.

From the analysis of the data and their cross reprocessing we proceed to returning the information in the form of a detailed definition of the training program.

We then move on to Action 3: defining the training program in specific intervention areas, case studies, goals and results and timeframe.

Individual training interventions are the answer to the needs and the desires previously emerged and that need to be trained. The interventions are designed to define the educational objectives and considering the participants' characteristics and their role within the firm. The training plan is then fully defined by articulating each activity in terms of educational objectives, contents, receivers, duration, training methods and abilities to achieve. The processing of all the data collected in Action 2, in relation to the specific needs of each firm, allows the generation of the program for the development of the innovative project taking to the definition of the "Creative Lab" model.

Approaching Action 4 the program is aimed at the implementation of the model indicated as "Creative Lab", which is a working environment enabling the participants to express their creativity. The main topics that compose the core of the program are:

IDEActivity and Gamestorming, entry-level Creative Problem solving + expo events; IDEActivity/CPS with instrument development; IDEActivity/CPS with introduction to the project "adaptive and dynamic environment"; Creative Leadership and Team Building; Advanced techniques and creative sessions.

In this paragraph we will focus only on the two methods IDEActivity and CPS. The intent is to validate the structure that enables the firms to learn and experiment with techniques to seize the real potential of the methods introduced and applying them directly on real issues that are relevant to them.

The two methods are basically similar in the approach to problems and allow creative processes to develop. They are aimed at different applications: IDEActivity is more oriented towards innovation and product development while CPS is more suitable for strategic planning, optimization of services and process management.

The integrated method IDEActivity is designed to be a fluid and flexible instrument that adapts to the needs of companies with different objectives and structures. With an integrated method we can create a structure that brings together different known techniques. Such method has a core part of "play", intended as the ability to accept challenges, to cooperate, to become a team and to look at things from a different perspective with the help of others.

Given the large number of available techniques, they are grouped according to the main phases of the idea generation process: definition of the problem, generation, selection and implementation of the idea, evaluation.

Some of the techniques described in this paper, should only be expanded in order to give examples. The program of the creative session must be structured considering specific objectives, available resources, budget and many other factors that the team has to manage during the ideation phase.

IDEActivity counts on 3 macro-steps:

1. Fact finding and Set up

Objectives, brief analysis and definition of teams

Selection of approach

Definition of groups for creative sessions

2. Creative sessions

Preparation of creative session and design of instruments

Idea generation session

3. Selection and validation of ideas

Analysis and ranking of generated ideas

Selection of ideas to develop

Fact finding and Set up

The goal of this step is to *set up* the entire process. It is necessary to provide all the methods needed to define a work environment that will allow the participants to express their creativity, to create "creative groups", to support the people that will act as catalysts of creativity and facilitators of the creativity process to emerge.

A first fundamental step consists of a preliminary research of: context analysis, historic references, benchmarks, state of the art innovative materials and technology, as well as all other aspects connected to the analysis: receivers, conditions of use, possible competition in order to define the objectives and/or a briefing.

Creative Sessions

This step is focused on the actual production of the tools to be used as incentives during the creative sessions.

To develop these sessions IDEActivity uses a different combination of methods of knowledge-elicitation-tools such as mind map; card sorting; brainstorming; storyboard.

According to the objective and to the firm's reality we can choose not only the different techniques but, also the kind of incentives or the sceneries to be used during the sessions. These are chosen in relation with the observations and analysis based on the information collected in the previous Actions.

The preparation of the creative session starts from a graphical elaboration of the problem together with the definition of the objectives to be explored during the activity.

The participants are introduced to tools used by designers to translate concepts into diagrams or storyboards: the main idea would be placed in the centre of the diagram while the other information and in-depth details would be connected on the sides.

After finalizing the formalization of the objectives and after visualizing the problems and/or the requirements follows the introduction of IDEActivity. The production of the IDEActivity Cards is central for managing the phase of ideas generation during the brainstorming. In this context game is surely an important component for involving people, breaking preset mental patterns and trigger new reactions and new thinking connections. The Cards become an important and flexible tool able to support information gathering, user involvement and lateral approach to problems. The Cards can be produced each time according to specific aims/objectives.

They are divided in 4 categories:

1. Ask: recruit people to have information useful for the project;
2. Look: observe people to understand what they really do instead of believing what they say they do;
3. Learn: analyze collected information to identify models and possible intuitions;
4. Try: simulate activities to try and identify with people and evaluate suggestions or possible design directions.

IDEActivity requires the realization of at least one card for each category and a few more for Try. More relevance is given to the Card Try because particularly effective in facilitating a shift of prospective and enabling a wider vision of specific issues.

It is necessary to have all material ready before the beginning of the brainstorming session. The aim is to use the Cards together with materials for prototyping in order to enable the participants to visualize their ideas using a practical approach.

In the end of the brainstorming phase an appropriate method of evaluation of the ideas generated during the creative session is selected. This method depends on the critical level that needs to be reached, using a simple ranking technique or using an in-depth evaluation such as De Bono's 6 hats technique.

After the planning and the preparation of the material, the participants in the training will move to the idea generation phase. Before starting the creative sessions rules and suggestions for the correct implementation are reviewed.

The creative session is composed of two phases: divergence phase and convergence phase. The former (divergence) is of quantity generation of ideas, not filtered in any way. The latter (convergence) is of evaluation and the selection of the ideas collected.

It is fundamental to all the creative techniques to:

- Avoid evaluations;
- Create analogies and metaphors;
- Invent the ideal solution starting from imagination;
- Relate concept and things that were not related before;
- Generate different solutions to the problem.

Selection and validation of ideas

The convergence phase, where ideas are spotted, evaluated and limited to those more that are interesting, needs to be carried out, setting first of all the criteria of selection.

The steps planned for this phase are:

- Classification of ideas;
- Formalization and rationalization of the ideas generated and of the eventual concept;
- Integration of ideas into possible scenarios.

The Creative Problem Solving (CPS) is a methodology that allows working individually or in a group in a creative and efficient way increasing the ability to find innovative solutions to problems bypassing the more conventional ones. This methodology allows for improving analysis abilities, identifying the problems and the solutions. Furthermore it allows for evaluating the efficiency, the possibility of implementation, and finally choose the most appropriate solutions.

The Creative Problem Solving (CPS) is a structured process for identifying and solving problems and/or detecting new opportunity spaces where new and useful solutions are a priority. The CPS is a form of deliberate creativity, built on people's natural creative attitudes. It can be used to go beyond conventional thinking in order to generate creative solutions.

The model ideally counts on 3 main areas of intervention: Fact-finding, Idea-finding and Solution-finding. Each area is then approached in trough 3 consequential steps.

Step 1: Clarification. This step intends to identify what needs to be resolved and includes a phase of exploration of the vision and formulation of the main challenges.

Step 2: Transformation. This step intends essentially to identify ideas and translate them into solutions. It includes a phase of exploration of the ideas followed by the formulation of solutions.

Step 3: Implementation. During this step solutions are refined and an operative work plan is created. It includes a phase of exploration of acceptance and the formulation of the work plan.

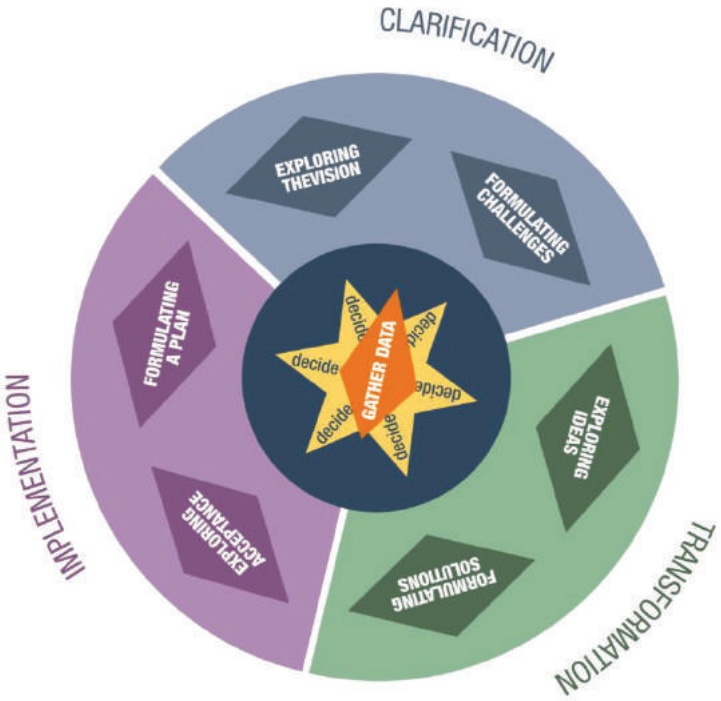

Figure 2. Creative Problem Solving (CPS) model elaborated by Puccio, Murdok and Mance (2007).

The model includes both cognitive and affective skills (Puccio, Murdok and Mance, 2007). The areas and the steps characterizing the process are essential to the various aspects of the process. In every step of the process there are both divergent thinking (generation of a broad number of new ideas) and convergent thinking (selection of the options and evaluation of the alternatives). The areas and the steps might be ideally followed in sequence, but not necessarily. CPS steps might not be used in sequence due to specific considerations on the problem to be solved.

Affective Skills that Support CPS

Affective Skill	Definition
Curiosity	A desire to learn or know; inquisitive
Dreaming	To imagine as possible your desires and hopes
Sensing Gaps	To become consciously aware of discrepancies between what current exists and what is desired or required
Playfulness	Freely toying with ideas
Avoiding Premature Closure	Resisting the urge to push for a decision
Sensitivity to Environment	Awareness of your physical and psychological surroundings
Tolerance for risk taking	Not being shaken or unnerved by the possibility of failure or setbacks

Thinking Skills Associated with CPS

Thinking Skill	Definition
Diagnostic	Making a careful examination of a situation, describing the nature of a problem and making decisions about appropriate process steps to be taken
Visionary	Articulating a vivid image of what you desire to create
Strategic	Identifying the critical issues that must be addressed and pathways needed to move toward the desired future
Ideational	Producing original mental images and thoughts that respond to important challenges
Evaluative	Assessing the reasonableness and quality of ideas in order to develop workable solutions
Contextual	Understanding the interrelated conditions and circumstances that will support or hinder success
Tactical	Devising a plan that includes specific and measurable steps for attaining a desired end and methods for monitoring its effectiveness

Figure 3. CPS Thinking Skills and Affective Skills. Source: Creative Leadership: Skills that Drive Change Puccio, Murdock, Mance (2007)

Conclusions

As a result of what is outlined in the above paragraphs, it is necessary to involve companies in new creative process to raise their awareness and abilities in creating and promoting a creative environment able to influence innovation through both the creation of new ideas and the optimal use of available know-how.

As it is shown in the Figure 4, generating a creative atmosphere in the firm is fundamental to build an effective link between creativity, innovation and design, and to shape the companies' competitive edge through innovation.

A first pilot project was started with the participation of three different firms that are experimenting at the moment with the new methods, but above all trying to achieve a continuous creative attitude. This Training Plan, tailored in every implementation to the needs of the participating company becomes our flexible and innovative format for permanent in-house training.

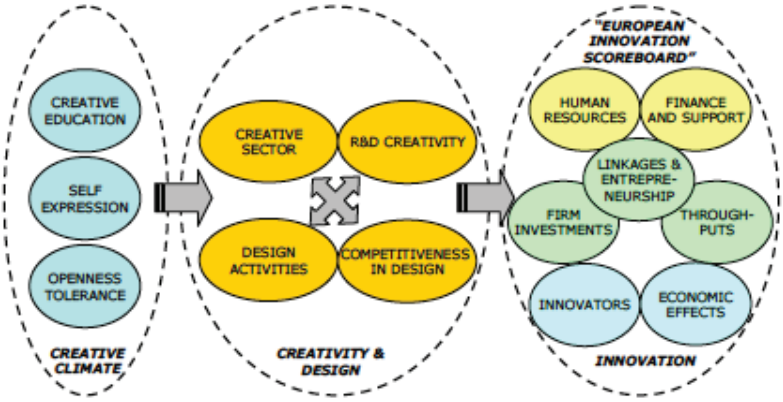

Figure 4. Diagram showing the importance of creative atmosphere in relation with creativity & design in order to achieve innovation (Hollanders and van Cruysen 2009).

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