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CREATIVITY AND DESIGN TOOLS AS AN EMOTIONAL APPROACH TO LEARNING

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ABSTRACT

This paper presents an experience conducted by the IDEActivity research team of the Politecnico di Milano, Department of Design during the CREA International Conference on Creativity and Innovation – a training and resource-sharing event focused on creativity.

The CREA event was crafted as a learning activity that allowed participants to delve deeply into the most significant stages of the design process in a very experiential way. The activity was designed as an experience and emotional path intended to introduce non-designers to the main phases and peculiarities of the design process in a very short time. In the event we employed the IDEActivity method: a dynamic path that includes a series of iterative phases and micro-phases characterized by alternate moments of divergence and convergence allowing for continuous circles of reflection and tuning of the project throughout the design process.

The case study presented in this paper shows the potentialities of the emotional involvement of participants, the dynamic use of space, Visual Thinking and a playful approach during a training activity. During the activity typical and renowned design tools were used along with specialized tools crafted by the IDEActivity Center for the event.

KEYWORDS

Active learning. Creativity. Design process.

LEARNING IS A PHYSICAL, EXPERIENTIAL AND EMOTIONAL ITINERARY

In general, the brain struggles to constantly maintain a high level of attention. Research published by LaBerge in 1995 seems to indicate that high levels of attention may be achieved for a maximum of 10 minutes or less at a time, therefore allowing the brain to constantly reassess its priorities and, consequently, to refocus on a new object of attention. Bearing this characteristic in mind, it is logical to structure the learning activity so as to alternate moments of concentration and of light mental relaxation.

Given the complexity and volume of information required to be transmitted in a short timespan (activity of 90 minutes in total) we found it useful to refer to the questions that appear in the Dale's cone of experience tool: what kind of learning experience is desired? Which, and how many, senses can students/participants use to learn the instructional material? (Anderson, 2005)

In order to provide the most adequate response to the specific training requirements of our learning event we found it was helpful to answer these questions by designing a learning experience based on an experiential learning. This research has identified the following key-factors: *a flexible use of space; the provision of adequate materials (visual representation); a playful and/or game-based approach; emotional involvement of participants.*

The aim of creating a physical, experiential and emotional itinerary was dictated by the close connection linking emotions to the learning process. Emotions drive attention, create meaning, and have their own memory pathways (LeDoux 1994).

According to Dale's research, as illustrated in the figure 1, the least effective method (at the top) implies prior knowledge of the information presented through verbal symbols, that is, by reading and listening to the words pronounced.

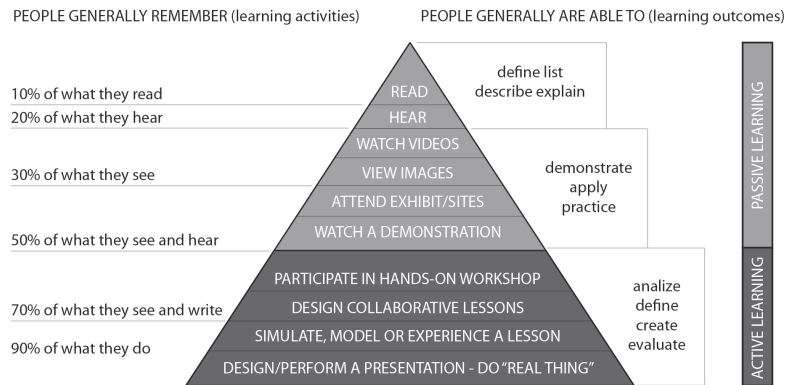


figure 1 Dale's Cone of Experience

The most effective methods (at the bottom) involve experiential learning, such as hands-on or field-based practices, in particular intentional ones associated with and linked to the real world. Perceptual learning styles are sensory based. The more sensory channels possible in interacting with a resource, the better chance that many students can learn from it. "According to Dale, instructors should design instructional activities that build upon more real-life experiences" (Anderson, 2005). The further down the pyramid we proceed, in fact, the more effective the learning method becomes. This suggests that the involvement of students in the didactic process reinforces the acquisition of information and the consolidation of knowledge. The IDEActivity Center has developed a method and a set of tools for design, focusing especially on the importance of creativity in achieving innovation. The design of these kinds of training activities was found to be similar in many ways to the planning of a co-design activity. It was actually very interesting to note the points of contact and to highlight the common key issues such as: the importance of communication, the management of physical space, atmosphere, the creation of a playful mood and the pace of activities.

VISUAL THINKING – A POWERFUL TOOL FOR ORGANIZING AND RETAINING INFORMATION

The learning process requires the active participation of the subject (Mayer, 2000). The brain selects the relevant information and then organizes it in a mental representation, integrating it

with prior knowledge in order to produce a single model.

Visual and verbal information, each with its own distinctive characteristics, are key elements in the learning process. This is a multimedia-based process (Schnotz, 2001), as it requires both systems to be present. While the formers can only be graphic (images) or descriptive (texts), the latter can simultaneously assume both natures. The learning process differs depending on the type of external representation it employs.

In processing a text, the brain first elaborates a mental representation of its superficial structure. It then outlines a propositional representation of the text's semantic content and finally, it elaborates a mental model of the subject. These processes are guided both by the sensory information perceived and by prior knowledge.

By contrast, when processing an image, the mind first perceives, elaborates and creates a visual representation of it, which is subsequently reinterpreted semantically (providing meaning to the image); finally, it constructs a mental model of the subject. Adhering to one of the principles set out in Mayer's guidelines, which state that learning increases when words are associated with images – as the resulting integrated mental model is richer in information that can be accessed at a later stage – we established Visual Thinking as one of the key elements of our model. Images – the typical mode of expression employed in Design, as opposed to other fields – act as a tool that enables the organization of information, fostering learning throughout the process. Words and images can convey the same information; however, while images reflect the appearance of the object they represent non-arbitrarily, words have no likeness to the content they refer to. That is, images represent; words describe.

In a well-known experiment conducted by Shepard (1967), each subject was presented with 600 photographs, and subsequently with a pair of two images including one that they had previously viewed among the photographs, which they had to distinguish from the one they had not seen before. The final mean error value was attested at a mere 1.5%. When the same experiment was conducted using phrases rather than images, the final mean error value rose to 11.5%. Therefore, the image system is distinctly superior in terms of long-term memory. This supports the idea according to which, to foster long-term retention of the

information supplied during an activity, it is sensible to employ Visual Thinking and to favor communication through images – specifically images referring to concrete objects – rather than verbal communication. The visualization of ideas through sketching “provides a temporary, external store for tentative ideas, and supports the *dialogue* that the designer has between problem and solution” (Cross, 2011).

SPACE AND ENVIRONMENT – THE ESTABLISHMENT OF A PARALLEL WORLD

The physical and emotional involvement of participants constitutes a key element in the learning and design activities we propose (Douglas, 2013). This explains our decision to incorporate music, light and theatricality in the learning environment. Our objective is to create a new, shared language, appropriate to the context in which training or co-design activities take place.

“The three factors related to the person, process, and environment interact to produce specific results. In other words, the quality of the creative product depends on the fact that people support certain processes within specific environments” (Puccio, Mance and Murdock 2011). Numerous studies have concluded that an adequate space and environment should be designed to allow for exchange, dialogue and debate, by providing a dynamic and customizable environment and flexible enough to be able to adapt to people’s changing needs. It should promote an open-minded attitude and the suspension of judgment, hierarchies and business roles.

«The design of a space can support innovation and project success (...) a stressful or even depressing work environment doesn't give one the mood to think of doing things differently» (Curedale, 2013).

Structuring the space and the environment with these elements in mind constitutes an essential element in planning co-design or training activities. For the proposed activity, the IDEActivity research team decided to design the space and the environment as an integral part of its method. The aim is to transform the process of learning per se into one of learning by experience.

An inspiring space is an important strategic element as it acts on multiple levels, fostering the transition between moments of attention, assignation of meaning and the pre-consolidation of information. The training environment was expressly created as a sort of parallel world in which participants were invited to enter as spectators and leading players: a foreign and peculiar setting to be explored and become comfortable within. The itinerary we proposed was a physical, experiential and emotional pathway that traced the phases of the design process through stopovers, at which participants were invited to take part in increasingly involving activities.

Greenbush, a pioneer in enrichment studies, says that experience determines which synapses are shed or, more importantly, which are retained. This forms the *wiring diagram* upon which subsequent development builds (Begley 1996). During the activity we have acknowledged the importance of setting up a space that allows for a fluid but rhythmic sequence of activities where stopovers or physical and mental pauses are essential elements for the retention of new information, its personal re-mapping and the emergence of new ideas.

THE PLAYFUL APPROACH – GROUP DYNAMICS AND THE CREATIVITY HIGHWAY

In order to foster a group of people and enable it to become a well-established and cohesive *creative* team they must become familiar with their surroundings and with all the components of their team. In this context, the transfer of know-how should be accompanied by a series of short activities designed to facilitate the generation of a favorable creative climate, which encourages team spirit and the sharing of objectives.

For this reason, the use of icebreaker and energizer activities intended to overcome the initial resistance and preconceptions of participants (possible barriers to teamwork) is particularly useful both in creative sessions and training activities.

These initial activities embed a relevant component of playfulness and are able to raise attention levels and create a positive learning environment or climate. Many theories and studies in the fields of psychology and pedagogy have identified

a particular moment in the game as useful for learning; Schaller (1861) identified games as providing a time of rest and recreation, Gross attributed to games the ability to stimulate capabilities that are present within the human essence, at the instinctive-intuitive level, while for Huizinga (1938) game were a basic human trait, placed at the origin of culture and social organization. Recreational activity is opposed to work and is the bearer of values such as generosity (opposed dialectically to utility) and imagination (dialectically opposed to reality). Both in co-design and training activities ice-breaker, energizer and other playful activities are used by the IDEActivity research team to consolidate the team and create a positive climate. These techniques are intended to strengthen or produce meaningful relationships within the group, involving corporeality as a means of expression and communication and as a stimulus to open-mindedness and *lateral thinking*. Another important element is the creation of spaces for interaction meant to overcome differences (often present in corporate structures, universities, etc.). All participants are equally important and everyone is openly recognized as *a person with significant potential*.

Game is being used as a workout space for the group that, because of its manifestation in the form of imaginative simulation and an opportunity to understand information in a more immediate and profound manner.

The underlying messages, explained at the end of these activities, provide each participant with insights into the dynamics occurring within the group and into the mental and creative processes triggered during activities, bringing participants to develop greater self and group awareness.

THE IDEACTIVITY TOOLKIT

The IDEActivity Center research team focuses its research efforts on creativity-led innovation through design, in both the public and private sectors. The IDEActivity Center has developed a method and a set of tools for design, focusing especially on the importance of creativity in achieving innovation.

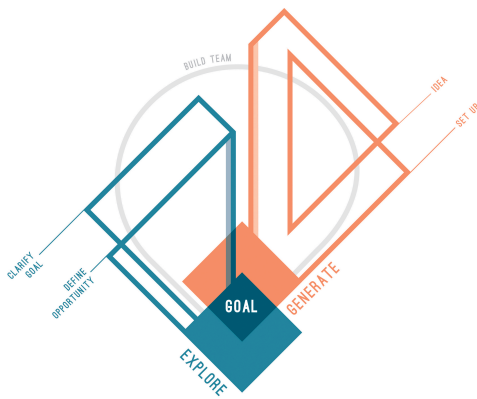


figure 2 IDEActivity method

The Center has developed and tested its own methodology, building on different design methodologies and approaches, in particular Human-Centered Design, Co-design, Participatory Design and Design Thinking.

The IDEActivity method (Canina, Anselmi and Coccioni, 2013) is designed to be a flexible tool for use in different configurations according to the specific goals to be addressed. Focused on the importance of creative thinking and learning by doing, the methodology tackles creativity with tools and approaches typical of the design environment. It aims to break pre-set patterns, stimulate the imagination and improve the conditions in which knowledge and information are handled, communicated and retained, and ideas are produced.

This method relies on a fundamental *play* component, and leverages the potential of self-exposure, collaboration, teamwork, and the ability to look at things from new perspectives, both individually and with the help and influence of others. The IDEActivity methodology integrates and mixes various well-known techniques together with new ones that are often developed to meet the goals of a specific project or activity. The key features of IDEActivity are closely linked to the visual, communicative, sensory and emotional dimensions of design. It is supported by a toolkit with a selection of tools and techniques that can be used during the specific design and/or training activities. The method is designed to ensure a fluid yet rhythmic sequence of activities. It is divided into three main phases, presented below, that are chosen according to the main goal of the design challenge to be addressed.

Explore. This phase allows for the creation of the groundwork that permits a significant and potentially viable goal to be defined. It is important to go beyond an impersonal analysis of the material, interpreting it with an open attitude, creating easily identifiable mental pathways and locating unexpected connections.

Generate. The idea-generation phase is carried out with the support of different tools, used to stimulate creativity and generate suitable solutions consistent with the context and the goals of the training or the design activity.

Build Team. This phase is transversal to both the Explore and

Generate phases. The different phases of the design process often require diverse skill-sets. Depending on the context (training or design activity), assembling a team capable of taking part proactively in the different phases is a key step in achieving the final goal. The same team might not necessarily take part in the different phases (Explore and Generate), as the two phases might require different skill-sets and personal predispositions. The three phases are supported using a selection of tools belonging to the fields of Design and Creativity. Tools and techniques are categorized according to the different phases of the method and are collected in the IDEActivity Toolkit, designed to assist people in the practical application of the methodology. The IDEActivity toolkit includes a set of cards and a range of corresponding tools used to illustrate the main steps of each phase and sub-phase of the creative and design process, and to provide guidelines for the tools required in each phase or sub-phase. The set-up phase begins by designing a set of cards to be used during the creative session.

CASE STUDY: the CREA training activity

The IDEActivity Center was invited to take part as a proactive player in CREA – The International Conference on Creativity and Innovation – contributing the results of the research it has conducted on the topic of creativity for innovation through Design.

The event was targeted at consultants, trainers and professionals working in different roles in the creative field, which shares many contact points with Design, but is still somewhat separate from it. The IDEActivity Center therefore decided to design a kind of concentrated training course to introduce the conference audience to the phases, concepts and techniques of the design process and expose them to the approach to creativity used in the discipline.

We decided to propose an activity built on the concept of experiential learning, which was designed to be engaging in both emotional and physical terms. Consequently, it was important from the very beginning to consider the environment as an integrating part of the experience: a vehicle for the training

itinerary capable of effectively support the learning process. This meant not only managing the space, but also organizing communication and the rhythm of the learning experience proactively.

Taking as our starting point the results of scientific research that has demonstrated that non-verbal forms of communication and physical and emotional involvement favor the interpretation and internalization of an experience on multiple levels, we chose to develop the training itinerary as follows: *space scenography, visual thinking and playfulness*.

The event featured the emotional involvement of participants and a dynamic use of space. The environment was expressly created as a sort of parallel world in which participants were invited to enter as spectators and as leading players: a foreign and peculiar setting to be explored and become comfortable within. The itinerary proposed was a physical and experiential pathway that traced the phases of the design process by way of *stopovers*, at which participants were invited to take part in increasingly involving activities.

The entire experiential pathway started with the three-dimensional rendering of the IDEActivity method, with its division into two principal phases: Explore and Generate. Participants could walk among the toolkit cards that were projected in the specific area of the path in which they were involved. This approach allowed participants to mentally construct a comprehensive three-dimensional image of the process, depicted as a path, and to visualize the creative techniques and tools pertaining to each phase of both the Explore and the Generate areas.

We created a new, shared, language, adapted to the environment in which we were performing: a wordless language in which the repetition of specific gestures and sounds set the pace for each activity and/or stopover, and whose fluctuations and interpretations acted as extremely important instruments to encourage communication and participant involvement.

Silence and physical movement were important in creating the environment and maintaining high attention levels throughout the itinerary: music effectively and pragmatically supported and accompanied the operative movements; light focused attention on specific points of interest and images stimulated the

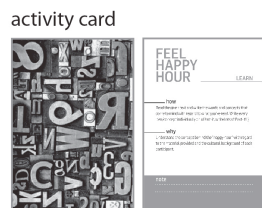
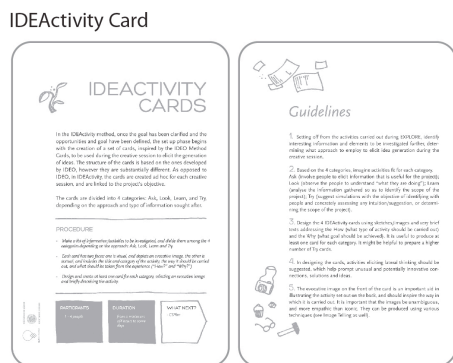


figure 3 IDEAActivity Cards, toolkit excerpt (left) and activity card (right)

emotional and sensory perceptions of participants.

We proposed a simplified yet exhaustive version of the design process, focusing on three different phases that were spatially represented as stopovers along the itinerary:

1. Researching and identifying final users (Clarify goal, within the Explore phase)
2. Observing and prototyping evident and latent needs, to define potential opportunities (Define opportunity, within the Explore phase)
3. Generating and prototyping ideas to come up with new solutions (Idea, within the Generate phase).

Each phase/stopover was linked to a card from the IDEAActivity toolkit and presented by way of an activity card, which provided participants with the only available guidelines for each activity. Though the cards follow, the conceptual structure of the IDEO cards they are substantially different, as they are non-generic and specifically cater to each creative session and to the specific objective of the project. The cards used in this case study were crafted specifically for the CREA learning activity.

For the opening activity, we designed a very simple yet highly effective test to clearly demonstrate the function of non-verbal communication (Visual Thinking) to the participants (trainers and consultants) who usually prevalently employ overwhelmingly verbal language. The participants were divided into two groups, the first of which was provided with a mood board containing evocative images, while the second received a descriptive text. Both the mood board and the text addressed the same topic, and shared the objective of eliciting the association of key-words, concepts and ideas during an equal and predetermined amount of time. Upon comparing the outputs of the two groups (written on individual post-it notes), it became evident that the group provided with the mood board had produced a significantly higher number of ideas, which were also superior in quality to those generated by the group using the text. This surprising result may be traced back to the intrinsic characteristics that typify these two individual forms of communication and which lead inputs to be processed differently. As explained earlier, texts are more reflective and at times are able to articulate more than images: images bypass the *barrier* of linguistic interpretation, which naturally leads consideration analyses of the subject to be

more considered and generally less immediate and instinctive. The first phase/stopover of the activity (the research – researching and identifying final users) followed this initial test. This phase was conducted by integrating two different tools: the mind map (Buzan and Buzan, 1993), and the mood board, typically employed in the fields of creativity and design respectively.

This mode of (re)presentation, then, allows every nuance – which when approached exclusively through key-words (the typical language employed by consultants) may often go undetected – to be grasped *at a glance* and in a highly concise manner. We also introduced participants to a tool contained in the IDEActivity Toolkit and which the design process employs habitually: Personas. Structured around the use of these instruments, the activity allowed participants to be actively involved, conveying and internalizing the importance of the exploration phase in preparation for the generation of ideas. With this in mind, and advancing to the second part of the itinerary, the group was invited to take part in an activity in which active participation was key. One of the steps in determining a project's potential scope requires the user's needs and demands to be identified through direct observation of the behaviors adopted in specific situations. We chose to have participants experience two techniques derived from the User Centered approach: Role Play and Expert Observation. After staging a scenario portraying a real-life situation, we used the activity cards to assign one group a specific series of actions they were required to perform, while the other group was asked to observe the exercise and identify any pertinent issues.

After gathering the issues identified by participants we suggested a final co-design activity. Smaller groups were formed and provided with a series of raw materials, with which they produced *rough prototypes* to visualize tangibly the issues that had previously been identified through observation, and to test the validity of the solutions suggested.

This activity of *rough prototyping* draws on the “silent game” proposed by Habraken and Gross. The use of tangible resources (string, cardboard, Styrofoam, scotch tape, etc.) within an atmosphere of complete silence permits participants to be involved on several levels and through multiple sensory

perceptions. The silence imposed a new game rule and creative challenge. It proved very effective, provoking constant reinterpretations throughout the prototyping activity; priorities were continually re-established, constituting an excellent deterrent against expressing judgment, a factor that can be highly inhibiting within the design and/or creative processes. The activity enabled the groups to a significantly number of high quality prototype solutions within the allotted timespan.

CONCLUSION

The training experience clearly demonstrated the value of identifying alternative ways of communication as a proactive stimulus to prompt a constant reinterpretation of messages both received and expressed. The decision to emphasize the emotional and perceptual dimension by developing an experiential path, configured as a space for reflection, enabled participants to achieve a rapid and in-depth understanding of the design process, providing a setting for the individual consideration required for learning. As we had hypothesized, the establishment of a multisensory experience allowed participants' in-depth understanding of the design process by involving all the senses.

«The affective side of learning is the critical interplay between how we feel, act, and think. There is no separation of mind and emotions; emotions, thinking, and learning are all linked»

(Jensen, 1998)

Physicality was expressed in terms of participant relations with the space and with others, amplified their involvement and heightened the emotional value of the training experience by fostering extremely high levels of attention throughout the activity. The creation of a customized physical environment facilitated time-management and provided a visual and experiential dimension to the design itinerary. Moving through the space, along the pathway, proved a highly effective method for fixing the various stages of the activity – and therefore of the design process – in the minds of participants.

These kinds of playful activities are intended to stimulate people's creative potential, and preventing negative emotions.

They promote active and creative relationships at both cognitive and relational levels and have proven, in our experience, to be a very effective means of knowledge-transfer.

The experience of applying the IDEActivity methodology and toolkit at the CREA Conference led to very positive feedback. Participants pointed out how the effectiveness of the transfer of the methodology and the toolkit materials had been facilitated by the overall atmosphere, space and communication management. Furthermore, it was underlined the importance of the environment, which was designed ad hoc for the activity, and around which the whole learning experience revolved. The emotional involvement and stimulation of the senses, the freedom allowed in the use of the space and the employment of images and visual thinking, as the preferred channel of communication, led the participants to a quick and more effective learning experience.

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