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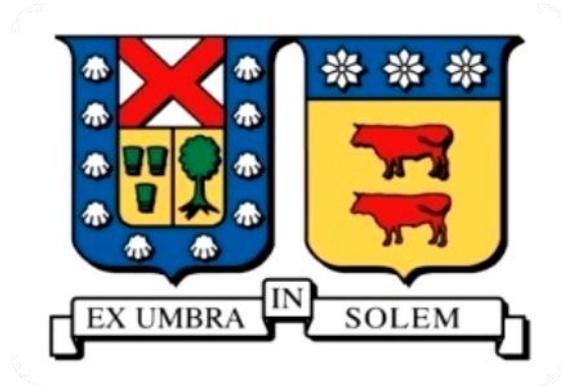
EXPLORING INNOVATION AND THE CREATIVE STATE: A METAMOTIVATIONAL STUDY ON CHILEAN SCHOOLCHILDREN

PALMA MARAMBIO, LAURA IGNACIA

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**UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA
INGENIERÍA EN DISEÑO DE PRODUCTOS
VALPARAÍSO – CHILE**



**“EXPLORING INNOVATION AND THE CREATIVE STATE: A
METAMOTIVATIONAL STUDY ON CHILEAN
SCHOOLCHILDREN”**

**LAURA IGNACIA PALMA MARAMBIO
TRABAJO PARA OPTAR AL TÍTULO DE INGENIERA EN DISEÑO DE
PRODUCTOS
CHRISTOPHER NIKULIN
NOVIEMBRE – 2017**

ACKNOWLEDGMENT

“The most successful scientists often are not the most talented, but they are the ones who are impelled by curiosity.” - Teresa Amabile.

I thank my close one's for encouraging and nurturing in me a curious, intense and distinct nature. Thank you for the carnival of laughter that my life has been.

To Sebastian, for being the sun that illuminated me. Your love, laughter and company made this trip one more of our adventures. Thank you for so much inspiration.

To my family for being an unconditional support team. You have taught me what strength, resilience and concern are. The shelter you give me is the sweetest gift.

To my friends, my ties to you are my greatest achievement, the company, affection and the strength with you surround me nourishes me every day.

To my teacher, Christopher Nikulin, for the infinite opportunities given. You saw potential in me and exploded it. Teachers like you change the destiny of people. Thanks for changing mine.

To all who participated in molding me to become the person I am today, thanks for all the love.

ABSTRACT

The research proposes the importance of the sketching process as an elementary brick towards to innovation process. In addition, the authors understand the relevance of the metamotivational states as source of inspiration for develop of better draw ideas. Consequently, this research focused on observing, by experimentation and in metamotivational terms, the behavior of students when challenge to create new visionary solutions by using the sketching process. At the same time, the students were evaluated by T/PSI questionnaire to understand their metamotivational state. This study revealed that paratelic mode is the predominant metamotivational state at high school in consecutive grades. Moreover, the studies showed how the number of students becomes more telic (in terms of % of students by course) when are close to finish their formal studies at high school.

GLOSSARY

Metamotivational state: Couple of opposite, mutually exclusive, states (Telic/Paratelic) a person can experiment when aroused by the same underlying motivational dimension

Telic: State achieved when a person's response is future oriented, serious-minded and goal seeking in front of a task. Usually obtained in people that prefer low level of arousal.

Paratelic: Obtained when individual response is playful, sensation-oriented, and spontaneous. Usually prefer high level of arousal.

T/PSI questionnaire: The Telic/Paratelic state instrument consists of a 12-item set, each item with a six-step rating scale, allows to know the metamotivational state in which a person responds to an activity.

Intrinsic motivation: Type of motivation an individual feels when seeking enjoyment, satisfaction or self-expression, among others, when put in front of a task.

Extrinsic motivation: Opposite to intrinsic motivation. Experienced when an individual engages to obtain goals apart from the task itself (such as rewards).

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1 INTRODUCTION

Currently, innovation seems to be a main drive for many different aspects such as technology, economy, environmental and social. Nevertheless, in literature seems quite often to identify at least two main arguments about innovation. The first one relates to economics, in the utilitarian meaning: innovation, provided that it is “useful”, is not only welcomed but even sought after. The second argument is related to creativity: innovation can be considered as a creative activity, creative (in the productive sense) of economic value certainly, but creative also in the sense given in the art (originality). (Godin, 2014).

In more details, Baragheh, Rowley and Sambrook, 2009, define the nature attribute of innovation like something new, even improved, which involves changes and those phases consider creation, generation, implementation, development and adoption of such innovation. (Baregheh, 2009) In such case, many authors understand innovation as a multi-step process whereby organizations transform ideas into new/improved products, service or processes, to advance, compete and differentiate themselves successfully in their marketplace (Adams, 2006).

In Plesk, 1997, words, ideas can be simply a logical connection of an existing

knowledge; the difference is observed when these connections involve new associations about our previous knowledge. The same author defines: *“creativity is the connecting and rearranging of knowledge – in the minds of people who will allow themselves to think flexibly – to generate new, often surprising ideas that another judge to be useful.”* Based on that definition it could be interpreted that when someone defines an innovation is intrinsically defining an idea that was first conceived in a novelty manner (Plsek, 1997).

From similar point of view, common knowledge makes us believe that exits more complexity to achieve creativity. Indeed, Plucker (1999) highlighted that creativity is not just a flexible thinking and mental free–association exercise. Our analytical - and logical - thinking abilities are also needed. The human creativity is a multifaceted phenomenon with cognitive, attitudinal, intrapersonal, interpersonal, practical, socio-cultural, economic, and environmental aspects (Plucker, 1999).

In addition, Plsek (1997), had already stated that the creative process involves purposeful analysis, imaginative idea generation, and critical evaluation; consequently, – the total creative process is a balance of imagination and analysis. Certainly, Amabile (1997), manages to

summarize the postulates, defining *creativity as the production of new and appropriate solutions, to open-ended problems in any domain of human activity; and innovation as the implementation of those new, appropriate ideas* (Amabile; 1983; 1988; 1990; 1996). (Amabile, 1997).

Therefore, according to the above, how can these solutions be achieved? What situations, variables or spaces can stimulate people, day by day, and make it easier to create new things?

This paper focusses on observing, by experimentation and in metamotivational terms, the behavior of the creative state through the years, analyzing and comparing the results of scholar students in high school education in front of a ludicall drawing contest that presents in its creation two of the three factors proposed by Teresa Amabile for creativity to emerge; cognitive skills, evaluated by drawing, according to the theory proposed in the conceptual design process, and social/environmental variables, evaluated in a learning-school domain. Finally, it seeks to validate the T/PSI questionnaire as a mean for the study of the creative state. To this end, participants were faced to a contest that consisted on drawing technological products or processes that they vision/forecast would exist by the year

2030; In the fields of drones, solar energy, robotics, 3D printing and virtual reality, which are currently considered main technological drives (they could pick one or more of the fields and combine). The students had to use both their rational and original abilities, as they would have to frame their proposals to the requirements established at the beginning of the contest (drawing in a fixed space, with defined time and resources), as well as proposing an original solution of how they think technology will evolve. Once the drawing chore was completed, they would have to fill the T/PSI questionnaire, which allows to know the metamotivational state in which participants performed the activity, and, according to our research, the achieve of the creative state.

2 OBJECTIVES

The detail of the general and specific objectives of the present title work are developed below.

2.1 General objective

Observe, by experimentation and in metamotivational terms, the behavior of the creative state through the years, analyzing and comparing the results of high school students in front of an especially design ludicall drawing contest.

2.2 Specific objectives

- Understand and manage definitions of terms such as creativity and innovation.
- Recognize the factors that affect and influence the creative state.
- Establish the importance of drawing as a cognitive variable for the promotion of innovation.
- Validate the T/PSI questionnaire as a mean for the study of the creative state.

3 SCOPE

The development of the present work focuses on the study of the creative state in high school students under metamotivational parameters. With this objective, special emphasis is placed on two of the three variables proposed by Teresa Amabile for the emergence of creativity: cognitive abilities and social/environmental skills. These variables are expressed through the conditions of the evaluation activity, the "MIL iDEAS" technological drawing contest, which is generated under the theory stipulated by the conceptual design process, that evaluates both cognitive aspects and technical requirements, while the social/environmental is restricted by the space context of the study, a school.

The proposed study should be able to provide information about the behavior of the creative state through the years, in addition to the factors that affect it and the implication of variables, such as drawing, on innovation. On the other hand, it seeks to validate the T/PSI too as an evaluator of the creative state.

4 STATE OF ART

The objective of this chapter is to address three themes that allow us to understand how the "MIL iDEAS" technological drawing contest is constructed as an evaluative instance of the creative state and the theories on which it is supported. The first one provides information about the types of motivations an individual can experience in the face of a working task, compared to metamotivational states, and subsequent, to a creative response, finalizing in the understanding of design as a connective branch between creativity and innovation. The second seeks to reveal the implications of a learning environment and the nurture or inhibit of creativity in children. Meanwhile, the third presents the conceptual design process, which, through its theory and tools, such as sketch, works as an enhancer of cognitive skills with a direct impact in the capacity of innovation.

4.1 Motivation as essential approach for creativity and innovation

Research in both the psychology and business literatures over the past three decades have documented that motivation varies as a function of several factors in the

work environment, including evaluation expectation, actual performance feedback, expected reward, autonomy, and the nature of the work itself (e.g., de Charms, 1968; Deci, 1975; Deci & Ryan, 1985; Hackman & Oldham, 1976; 1980; Herzberg, 1966). Moreover, both theory and empirical research have suggested that human motivation towards work can be categorized into two distinct types: intrinsic motivation, which arises from the intrinsic value of the work for the individual (such as its interest value), and extrinsic motivation, which arises from the desire to obtain some outcomes (such as rewards) that are apart from the work itself (Amabile, 1997). The predominant psychological view proposes that extrinsic motivation works in opposition to intrinsic motivation (e.g. Deci, 1971; Deci & Ryan, 1985; Lepper, Greene, & Nisbett, 1973; Lepper & Greene, 1978). Generally, these theorists propose that, when strong extrinsic motivators are present for task engagement, intrinsic motivation to do that task will decline. Highlighting Amabile's (1997), definition on her article "*Motivating creativity in organizations*":

Individuals are intrinsically motivated when they seek enjoyment, interest, satisfaction of curiosity, self-expression, or personal challenge in the work.

Individuals are extrinsically motivated when they engage in the work to obtain some goal that is apart from the work itself, or meet a constraint that is imposed by an extrinsic source.

Moreover, many case studies have found that intrinsically-motivating factor, can support creativity approaches. (Amabile, 1997) For example, people will feel self-determined if they have at least some autonomy in what they do – Decharms (1968), terminology establishes: "when persons feel like "origins" of their behavior rather than "pawns" of other's; people will feel competent, especially if they obtain feedback that indicates progress in their work, or suggests ways they can increase their competence." These conditions will be likely to obtain only when the difficulty of the job matches or slightly exceeds the person's skill level.

Some of the factors that studies show for the support of creativity are the following: a degree of autonomy in the workplace, job that the person perceives as positive and important challenge, interest and emotion in the work itself. (Amabile et al.1996; Amabile & S. Gryskiewicz, 1987; Amabile & N. Gryskiewicz, 1989) Consequently,

motivation seems to be one of the main variables that affect creativity and it appears that it is supported by recognition and rewards that confirm one's competence or the value of one's work, and by rewards that enable one to further pursue intrinsically interesting work (Amabile, Phillips, & Collins, 1993).

The interest falls in determinate what kind of motivation a person feels after doing an activity, to know how they perceive such situation, if they acknowledge recognition or not, if they are motivated to be creative or just doing something to obtain the goal proposed. In the search of a tool that enables to carry out such purpose is that the telic/paratelic state instrument (T/PSI) appeared, that state as follows. With the same logic, reversal theory posits that individuals reverse between opposing pairs of metamotivational states, being telic (serious-minded) or paratelic (playful). The telic and paratelic states are a pair of mutually exclusive, states that share the same underlying motivational dimension of felt arousal. In the telic state, an individual is serious-minded, focused on essential goals and future oriented (O'Connell K. A., 2001). In the telic state, the individual usually prefers low felt arousal, which is interpreted as relaxation or calmness; while high felt arousal is usually interpreted as

anxiety. In the paratelic state, on the other hand, the individual is playful, sensation-oriented, and spontaneous. Individuals in the paratelic state usually prefer high felt arousal, which is interpreted as excitement, while low felt arousal is interpreted as boredom. (O'Connell K. A., 2001)

Analyzing and comparing the previous paragraphs, the paratelic state seems to be associable with the intrinsic motivation, so, a person who can achieve the paratelic state might be stimulated by the kind of arousal that provokes the effects of the intrinsic motivation on that specific subject. Therefore, by the previous statements raised by Amabile et al (1996), it could assume that once that the paratelic state is achieved, it has been found a favorable environment for people to be stimulated and support their creativity, in which case people would have achieved the creative state, such postulate is a hypothesis.

In general terms, to respond the previous hypothesis, is important to understand: in what area can we see the creative process reflected? Such question forces to inquire *what happens between (and how to link) point A (creativity) and point B (innovation)?* Let's start crumbling point A. Warr (2005) highlighted that are three main concepts by which creativity can be define: the creative

process, the creative person, and the creative product (Warr, 2005). In the case of creative product, design function plays the main role in defining the physical form of the product to better meet the needs of the customer. (Ulrich, 2013). In other words, when talking about a creative product, there is a reference made to a design process made creatively, where a creative design process is proposed as an integration between the engineering design process and the creative process established from cognitive psychology (Howard, 2008) In this connection we found that creativity and design can thus be linked to innovation as the first contributes to the expansion of available ideas and the second to increased chance of successfully commercializing these ideas. (Hollanders, 2009) Design is therefore the process of channeling creativity – by definition a hard task - as it involves subjecting the creative process to enough constraint so that it can be of value to the organization, but not so much constraint that creativity is stifled. (Swann, 2005) Some may describe design as creativity deployed to a specific end. (Bitard, 2008) But also, design corresponds to a structured process that transforms creative ideas into concrete products, services and systems, and as such links creativity to innovation. (Hollanders, 2009)

In a simpler explanation, Hollander's (2009), manage to define the terms as follows:

“Creativity is defined as the generation of new ideas; design is defined as the shaping (or transformation) of ideas into new products and processes; and innovation is defined as the exploitation of ideas, i.e. the successful marketing of these new products and processes.”

In this scenario, Design refers to the cognitive process of generating and manipulating representations involved in solving a design problem within a given context and range of constraints (Lawson, 1997; Simon HA, 1999; Smith GJ & Gero JS, 2004; Gero JS, 1998). The design process involves a complex interplay between knowledge-driven or goal-driven thinking and environmentally-driven or data-driven thinking. (Lawson, 1997) It is a goal-directed problem-solving activity, in which process, originality as well as rationality is required (Archer, 1964) As Jones (1981), has suggested, it's appropriate to think of the designer as an explorer, searching for the undiscovered “treasure” of a satisfactory solution concept. In details, the process of solving design problems consists in the search of solution concepts

within a design state space, with the purpose of moving from a problem state to a goal state. (Simon, 1973) The more time a subject spent in defining and understanding the problem, and consequently using their own frame of reference in forming conceptual structures, the better able he/she is to achieve a creative result. Defining and framing the design problem is therefore a key aspect of creativity. (Dorst, 2001) or as Ricard, (2008), would emphasize "creativity will only start when all the information has been transmitted and comprehended." The author Suler, (1980), claim's: "Creativity is not some mysterious, invariable trait but a cognitive function shaped both by the immediate environment and by the larger cultural and historical context in which the individual lives". It is a continuous discovery of new ways in which humans examine and utilize their symbolic and physical environment. The cognitive strategies people use in resolving their actual problems are not inherent potentials of the brain nor universal features of human mind, but their thinking corresponds to the array of activities that their culture exposes and demands. (Häyrynen, 2009)

4.2 Where does the creativity and innovation process begin?

The quality of the educational system, the desire of people to express them artistically and the openness of a society towards different cultures determine the creative climate in a country. (Hollanders, 2009) Edward de Bono (1975) sees training in creative thinking as possible and essential. Research has shown many examples of how the environment is able to nurture or inhibit creativity in children. (Mellou E., 1996) Nowadays, there is a growing recognition of the role of the school in the development of children's creative abilities. (Mellou E., 1996). It can be challenging to incorporate creativity in classrooms (Kampylis, 2009). Teachers tend to inhibit creativity by focusing on correct responses, reproduction of knowledge, and obedience and passivity in class (Alencar, 2002). Right answers, after all, tend to be easier to evaluate than creative ones. Teaching in such a way as to discourage creative answers and approaches may lead to higher scores on standardized tests (with all the sociological, marketplace, and political consequences that entails). Teachers claim to value creativity, but hold negative attitudes towards it, and show little tolerance to attributes associated with

creativity, such as risk taking, impulsivity, and independence (Beghetto, 2006; Fasko, 2001; Runco, 2003; Westby & Dawson, 1995). Most teachers express the fear that encouraging creativity in the classroom could lead to chaos. (Aljughaiman & Mowrer-Reynolds, 2005; Beghetto, 2007; Westby & Dawson, 1995). When teachers do make efforts to encourage creativity, it is often the case that neither teacher nor students knows what the expectations are. Moreover, students fear that they will be critically judged if they produce something in which they have invested at a personal level. (Ranjan, 2013) Teet's (1985) study in young children indicated that changes in behavior can indeed be facilitated by changes in the classroom environment. She reports positive changes in the areas of "child-child interactions, teacher-child contacts, use of materials in appropriate areas and level of involvement with materials". Such program has to be based on the continuous enrichment of environmental stimulation (props, guides, intervention...) which lead to creative achievements.

4.3 Conceptual design and sketching as strategic tool for creativity and innovation

The initial stages of design seem to be quite similar in many disciplines, most of the methods, theories/methodologies aim to conceptualize and structure a design task and involve high level of communication and coordination activities. (Eastman, 2001) For example, engineering design. Engineering design is the use of scientific principles, technical information and imagination in the definition of a mechanical structure, machine or system to perform prespecified functions with the maximum economy and efficiency. (Fielden, 1963) The engineering design process is a methodical series of steps that engineers use in creating functional products and processes. The process is highly iterative, involving a cyclical process of idea generation, evaluation, and design improvement until the design requirement is met. (Fattepur, 2016) During the design process, a designer (e.g., engineer, architect, product designer) uses his or her expert knowledge of (e.g., dimensions, appropriateness of style and materials) to generate and evaluate ideas toward the achievement of a goal (e.g., building a

computer interface, designing an ecologically-friendly apartment building, generating a new travel mug), within a range of constraints (e.g., budget, space availability, client needs). (Lawson, 1997).

According to Cross's (2008), analysis, it is possible to sum up the different activities done by designers during Product Development Process (PDP) in four different phases: exploration, generation, evaluation and communication. These phases are organized in sequences, iterations, and loops, according to the heuristics of the design process. The descriptive model proposed by French (1985) consists in four phases as well: Problem analysis, conceptual design, schemes elaboration and detailed design. On the other hand, the creative process is also described according to four basic stages (with the understanding that individuals do not necessarily progress through these stages in a uni-directional or stepwise manner) (cf. Amabile, 1983, 1996; Hogarth, 1980; Stein, 1967; Wallas, 1926; Whiting, 1958). The first stage is problem identification. During which the problem-solvers recognize, define, and attempt to understand the problem or the opportunity facing them. The second is preparation. Where the problem-solvers gather

information and other resources necessary to tackle the problem or pursue the opportunity. The third stage is response generation, during which various ideas for solving the problem or pursuing the opportunity are designed. The fourth stage, validation and communication, involves the consideration of the ideas generated, selection among them, and formalization or communication of the selected approach. (Amabile, 1997) The four stages of creativity can be observed along the design process, but they are shaped in one specific stage, the conceptual design.

Conceptual design is the part of the design process where—by identifying the essential problems through abstraction, establishing function structures, searching for appropriate working principles and combining these into a working structure—the basic solution path is laid down through the elaboration of a solution principle. Conceptual design specifies the principle solution. In engineering design, conceptual design has been considered an 'early stage of design' in a systematic approach. (Pahl, 2013) During this stage, solution concept will emerge. Indeed, a concept is a description of the form, function and characteristics of a product, and usually is accompanied by a set of specifications, a

product analysis of the competition and economic justification of the project. A concept is usually expressed as a sketch or as an approximate three-dimensional model and is sometimes accompanied by a brief description. (Ulrich, 2013)

Designers interpret visual and verbal information using the concepts comprising their object world to develop mental representations of design ideas. (Heiser J. T., 2004) Idea generation and communication are central to any design activity; and need to be supported by some form of representation. (Eckert, 2004) Sketching is one of the best ways to absorb design ideas, during drawing pictures, there exists the need to pass an idea from mind to hand and to eye. (Lawson, 1997) Sketches, diagrams, graphics, visualizations, external representations—call them what you will—play numerous roles in thought and communication (e.g., Tversky 2001). Sketches are used as depictions of potential objects in idea generation, but also as thinking aids for reasoning about abstract concepts. (Eckert, 2004) They capitalize on human spatial experience and reasoning facility by representing abstract concepts spatially. They record information, to remind one's self or to convey information and preserve it for others. They externalize internal

thought, making it visible to self and others. They convert internal memory and mental manipulations to external memory and physical manipulations, relieving limited cognitive resources. They serve as a platform for inference, reasoning and insight. (Heiser J. T., 2004) Larkin and Simon, (1987), have shown that sketches are useful in problem solving because of their conciseness of representing data compared to sentential descriptions.

Drawing is considered a strategic process because it matches several dimensions along which strategies are defined: learner-generated drawing is goal-directed, serves to organize knowledge, and, when matched to the task, improves learning (Paris et al., 1983) As a strategic process, the behavior of producing a drawn, external representation is believed to be directly related to cognitive processes responsible for task performance (Van Meter, 2001). Drawing a picture corresponding to a text (or other kind of instructions instrument) can become a generative learning activity in which students engage in essential processing by mentally representing the presented material as verbal and pictorial representations; It also involves mentally connecting the representations with each other and with relevant prior knowledge.

(Mayer, 2009) By drawing, the students must translate the verbal text information into a picture that represents spatial relationships. (Alesandrini, 1984; Carney & Levin, 2002).

According to van Meter and Garner's, (2005), students who are asked to draw a picture while reading a text must engage in three cognitive processes. First, they must select the relevant information from the presented text. Second, they should organize the selected information to build up an internal verbal model of the text information. Third, the students construct an internal nonverbal representation of the text information and connect it with the verbal representation and with relevant prior knowledge. The same cognitive processes must occur when producing a drawing from verbal instructions.

Amabile, (1983), establishes that for creativity to emerge it is needed three factors: personality characteristics, cognitive skills, and social/environmental variables. Individuals who are high on some of these dimensions will have a higher likelihood of producing a creative product. (Russ, 1996).

5 EXPERIMENT APPROACH

The following study focus on observe the nature of behavior of the creative state in a learning environment, understood in metamotivational terms, through playful experimentation based on the characteristics of conceptual design in high school students. In this scenario, the authors proposal tries to validate the following, by applying the tool (T / PSI) it can be obtained a reasonable approach to observe the response of individuals put on study regarding their motivation.

5.1 Participants and design challenge

Participants were a total of 104 students belonging to the Saint Paul's School, located in Viña del Mar, Chile. The ages ranged from 13 to 18 years old, in the grades from 9 to 12 of high school - determined by their knowledge and capability of response to specific requirements-. The sample presented a 58% of girls and a mean of 26 students per grade.

5.2 Materials and instrument for experiment

The materials consisted of an eraser, one pen, one pencil and a sheet of drawings, size a3, specially design for this experiment, which contained the telic/paratelic item questionnaire, placed in its right corner. Such sheet and it's design can be observed at Figure 1 and 2.

The instrument selected for this study was the (T/PSI) questionnaire (mentioned above). The telic/paratelic state instrument is unrelated to gender, age, social desirability, or paratelic dominance. The telic/paratelic item set consisted of a 12-items each with a six-step rating scale. These items assessed the two aspects of the telic/paratelic pair: serious-mindedness/playfulness (SM/P) and arousal-avoidance/arousal-seeking (AA/AS). Each of the 12-items had the telic alternative as one anchor and the paratelic alternative as the other, 7 items assessed serious-minded vs playfulness, and 5 assessed arousal-avoidance vs arousal-seeking. Low values in the rating scale such as 1, 2 or 3 reflect the telic state. Higher values, 4, 5 or 6 reflect the paratelic state. The range of possible scores for the test goes from 12 to 72, with a cutting score => 41 for the paratelic state and =< 40 for the telic state. To review the list of items presented in the telic/paratelic state

instrument please check table 1 or annex 8.2.



Figure 1. Contest Drawing Sheet to be applied with students (In spanish)

IMAGETYPE

MIL IDEAS

Cuestionario:

A esta encuesta se presentan 15 pares de palabras que son opuestas. Marca el nivel de acuerdo que tienes con cada una. En el cuestionario de palabras que tienes dibujado en tu obra en los O.JINCOG, O.BALUTU, justo antes de ir a buscar el formulario cuestionario por ejemplo 2 o 3 etc.

Nombre: _____ Título: _____

Curso: _____ Temática(s): _____

Institución: _____ Contacto: _____

QUESTIONNAIRE

PERSONAL INFORMATION

COLLABORATORS

Figure 2. Selection of participants drawing

Serious-minded/playful items (SM/P)

- SMPLAY01 Feeling playful/feeling serious-minded
- SMPLAY03 Just having fun/trying to accomplish something
- SMPLAY04 Doing activity just for the fun of it/doing activity because it may affect my future
- SMPLAY06 Wanting to be serious/wanting to be playful
- SMPLAY08 Wanting to accomplish something/wanting to just have fun
- SMPLAY10 Living for the moment/focusing on the future
- SMPLAY11 Feeling serious/feeling playful

Arousal-avoidant/arousal-seeking items (AA/AS)

- ARAVAS02 Wanting adventure/wanting peace and quiet
 - ARAVAS05 Wanting to feel excitement/wanting to feel calm
 - ARAVAS07 Concerned about the future effects of my current activity/Not concerned about the future effects of my current activity
 - ARAVAS09 Wanting to feel less aroused/wanting to feel more aroused
 - ARAVAS12 Not feeling adventurous/feeling adventurous
-

Table 1. Set of serious-minded/playful and arousal-avoidant/arousal-seeking items for the identification of state.

5.3 Experiment procedure

Participants were tested per grade, in their classrooms, at their school in equal conditions. Each grade had a different day assigned for the realization of the activity, determinate by the school for time and organization purposes. Each participant received beforehand all the materials mentioned above. The instructions were given groupally to the classroom at the beginning, instruction time was not

considered as “contest time”. The steps were the following: First, fill in the corresponding boxes provided in the drawing sheet with the personal information by each student (see image 1). Second, the activity consisted of a technological drawing contest, whose undertone appealed to the strategy and cognitive skills utilized in the “conceptual design process”, previously detailed, where the students were asked to imagine and shape a product or process that will exist by the year 2030 in the

categories of drones, virtual reality, 3D printing, robotics and/or solar energy. Once this chore was finalized the students would have to complete the telic/paratelic state instrument placed at the right corner of their drawing sheet. The average time given to all grades to complete the contest was 31 minutes. Being a contest, it was mentioned along with the instructions that there would be one winner per course with an unknown prize, for those who completed all the tasks requested and, also, deliver the most original, but still realistic, drawing (for sample of drawings check Figure 2).

5.4 Results of the experiment

The test was scored as follows: Each result was computed individually according to the T/PSI instrument (per student/per grade), as mentioned before, a score of 41 or more would point to a paratelic state, which, according to our research, would correlate to the individual's intrinsic motivation, led us to interpret that that specific subject was stimulated to be creative, achieving a creative state for this specific task. The main objective was to analyze the performance of each grade and the variation of curve of state (telic/paratelic) as the years go by, linked to the percentage of creative states reached

as sample of behavior of schoolchildren facing a creative state promoting activity. General information and percentage responses of each classroom can be observed in table 2.

As can be seen in figure 3, despite that the paratelic state is always predominant along the grades, it drops constantly year per year, starting with an 84% of response in the 9^o, dropping to a 54% in 12^o. These results could be translated as disinterest on behalf of participants, for variables such as age, behavior, personal motivation, etc. However, is important to mention that the originality of drawings for technological products or processes presented by the students also showed a decreased of variation and complexity of ideas the higher the grade. It seemed to be less interesting for the older students to stay focus during the time given for the contest, presenting mostly the characteristics of extrinsic motivation. Ninth graders, on the other hand, not only stayed focus, but also asked –groupally- for extra time so they could perfect their ideas, gaining four more minutes than the rest of grades. It seemed they were not willing to hand their work until they were satisfied with the results. This behavior was interpreted as an intrinsically motivated group. Such conducts can be observed and compared in figure 8,

whereas the grade increases, also does the difference of opinion and responses per the group. The previous observation allowed us to appreciate the implications of the social environment when carrying out an activity, and the role that plays when measuring the creative state. In addition, and supporting this observation, the information provided by figures 4 and 5 allow us to determinate if the responses obtained per grade and

groupally were consistent. Thanks to this information we can support that the higher the grade the greater the gap difference of responses from students in terms of their states, reaffirming there is an observable higher group cohesion in 9 ° grade than in the rest of courses. The behavior of grades and the percent's mentioned above, are reflected on figures 1, 2, 3 and 4.

General Information				State Response					
Grades	N° students	Percent of the sample	Duration of activity (min)	Average score SM/P	Average score AA/AS	Average score	Telic Students	Paratelic Students	Predominant state
1st	25	24%	35	27	21	48	4	21	Paratelic
2nd	28	27%	31	25	20	45	8	20	Paratelic
3rd	27	26%	31	22	22	43	8	19	Paratelic
4th	24	23%	27	21	18	39	11	13	Paratelic
Average	26	-	31	23,8	20,3	43,8	7,8	18,3	Paratelic

Table 2. General Information of the study.

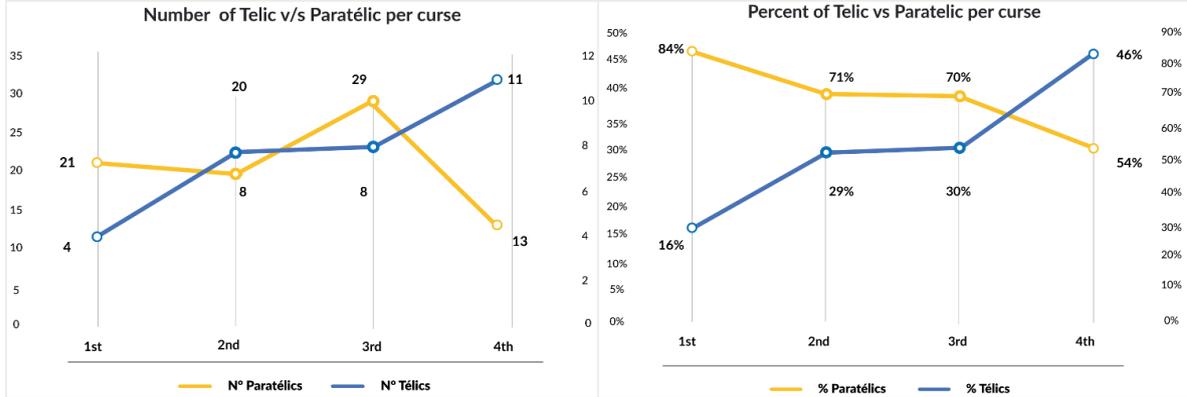


Figure 3. Comparison of curves by number and by percent; variations of state (telic/paratelic) per grade.

Subsequently an analysis of the instrument questionnaire was made; starting by a study of items, with the final purpose to determinate the existence of correlation by type of aspect (SM/P - AA/AS), and to understand better relation among variables (to observe the correlation figures see annex 8.3). Despite the existence of two different aspects, there is no correlation that can be affirmed by the type of each own and that these can be grouped for such reason.

Regarding the evaluation and validation of the instrument, when analyzing the following variables: the relation between the state per course and the number of

outstanding drawings (based on the novel but still realistic of the ideas) seemed that the T/PSI questionnaire shows a clear general response of the creative state of groups, consisting with the behavior observed when the activity took place. However, when looking separately, the instrument could be insufficient to determinate the response of participants individually by the following reason; As stated previously, there was a winner per course, selected by the novelty of his/her drawing, besides preserving the restrictions of what should be a technological product-process that could exist by the year 2030, and who also had completed the personal information boxes, and telic/paratelic

questionnaire. In this case, 3 of the 4 winners obtained a telic response on their questionnaire, winners from the 9, 10 and 12 grades. This situation could occur due to different variables, lack of time to respond with true feelings the questionnaire, an extrinsic motivation for those students, who deliver exactly what was being asked but with the goal of winning a prize as objective or maybe the T/PSI instrument is insufficient for assessing the creative state individually, but it's able to identify some of the attributes of creativity (type of motivation) and to deliver an acceptable general state response.

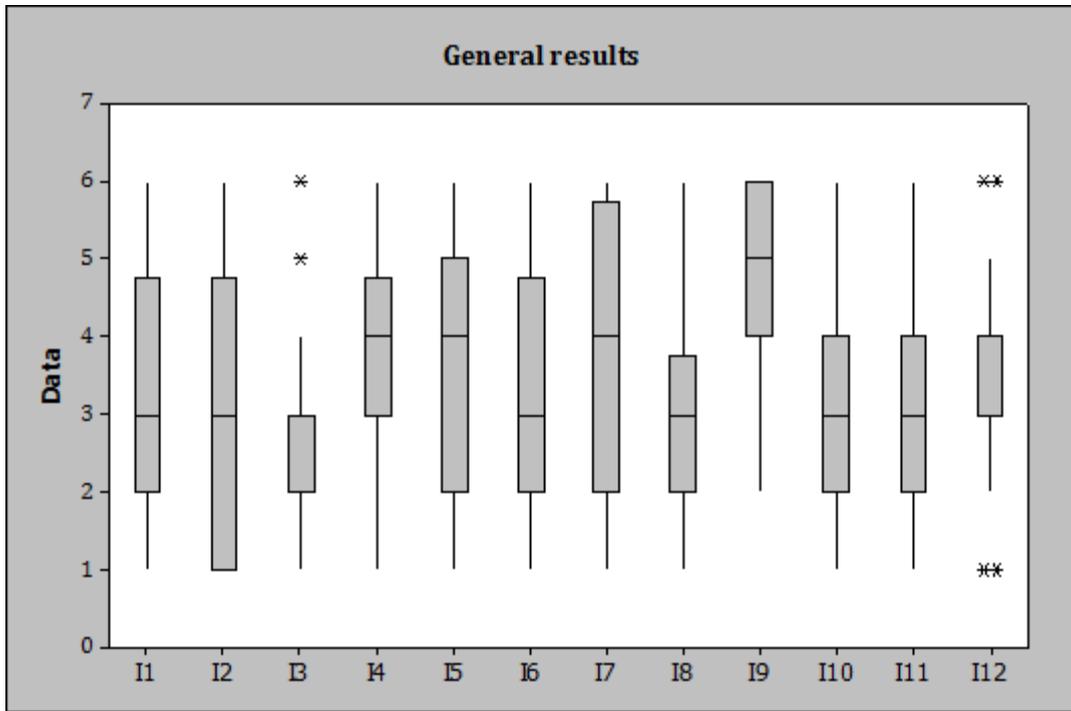


Figure 4. General box plot analysis for T/PSI answers by students.

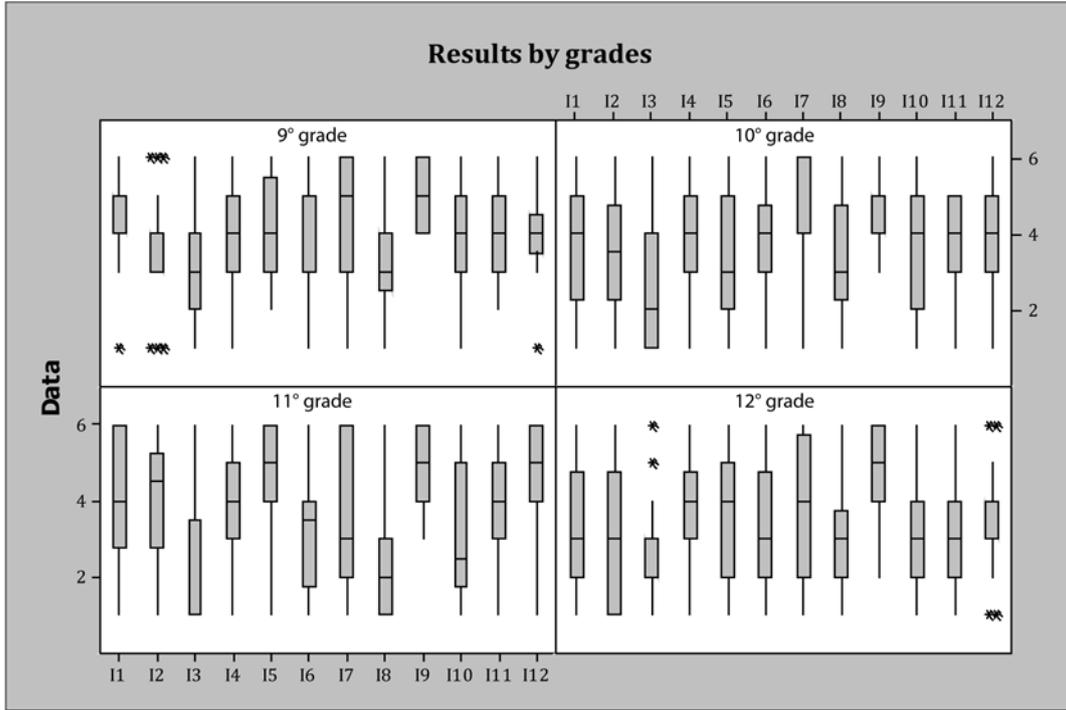


Figure 5. Results per each grade represented in a box plot analysis for T/PSI answers.

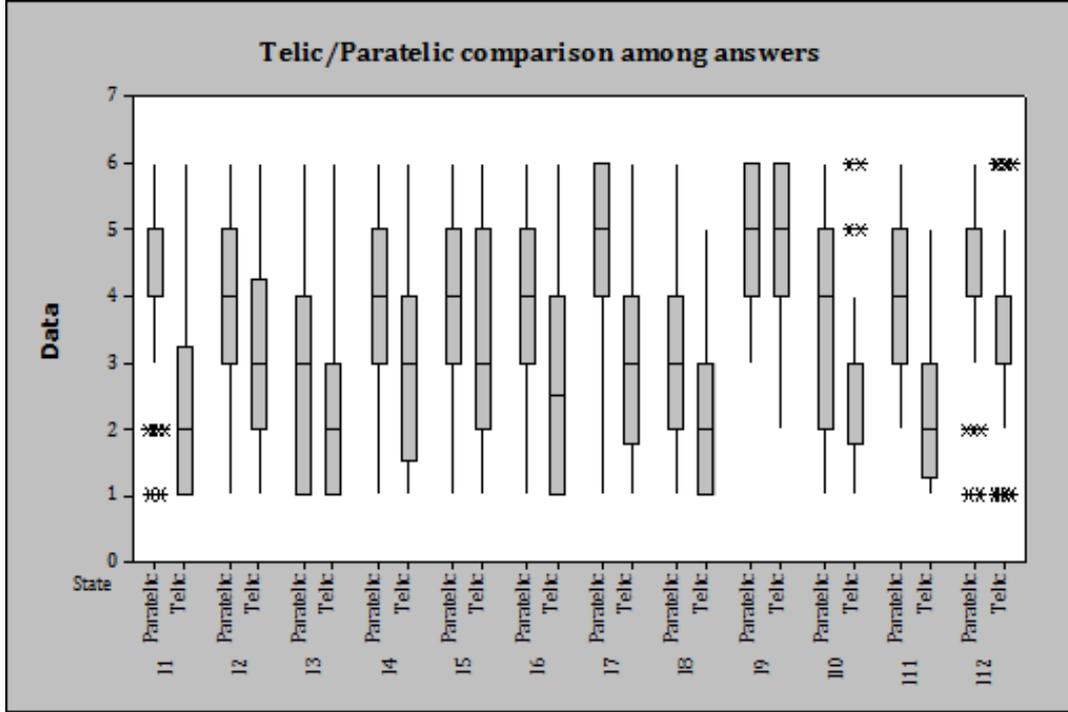


Figure 6. Telic/Paratelic comparison among T/PSI answers.

6 CONCLUSIONS AND FUTURE DIRECTIONS

The results of this study provide insight into the behavior of the creative state curve, but further analysis and variety of evidence is needed to show the complete conduct and complexity of the same, especially in lower school levels where cognitive abilities can be taught as a habit that enables creativity. Moreover, an analysis of the entire school period is recommended, to determinate what point and for what reasons there is a decline of the state.

Finally, as an idea for future investigation, it would be interesting to register how much time does the students take to understand and process the requirements of the task, before drawing, and compare the time between the winning students versus the rest of participants, to validate the relation previously proposed by Ricard (2008) (review point 4.1, page 15).

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8 ANNEX

In this section you can find the complementary information for the accomplishment of this work.

8.1 Methodology

The methodology is presented as a systemic sequence, where each stage contains some activity to be performed, generating its own output to contribute to the next stage.

Figure 7 shows the order and the steps for the accomplishment of this thesis.

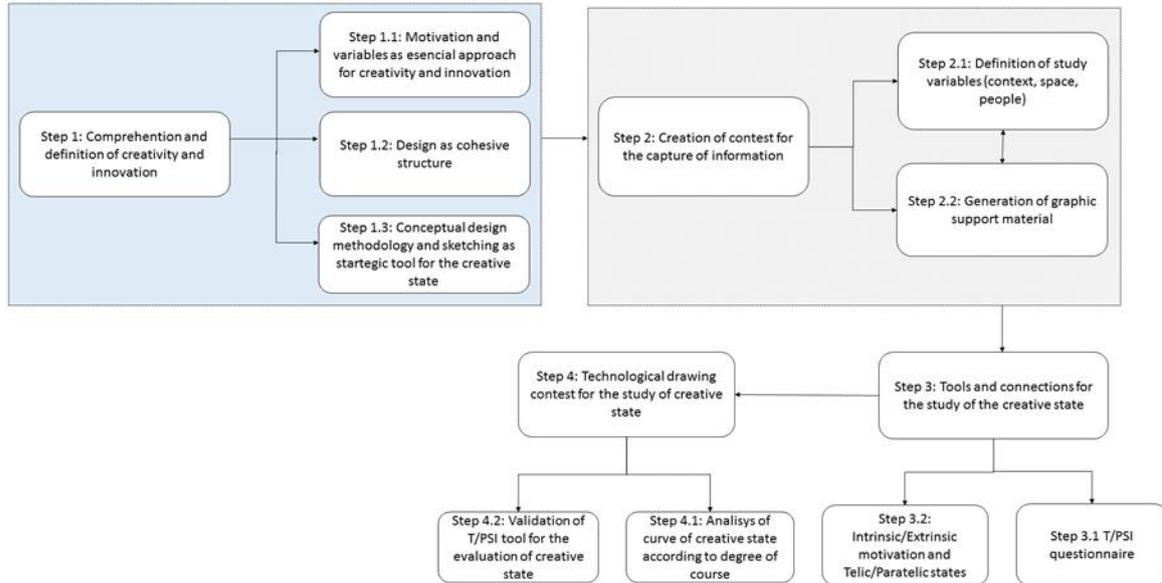


Figure 7. Stages of the proposed methodological process.

8.2 T/PSI questionnaire

There are times when a person is serious and goal-oriented and other times when the same person is playful and spontaneous. Although this fact is intuitively obvious, psychologists and other social scientists have not typically considered these differences in psychological state to be theoretically or empirically significant. The T/PSI questionnaire is a measure developed to assess whether a person is in the telic or paratelic metamotivational state. (O'Connell, 2001)

The test formulated by O'Connell and Calhoun (O'Connell & Calhoun, 2001), who called it Telic/ Paratelic State Instrument (T / PSI); consists of two parts, one that measures whether the subject behaved in a serious or playful manner (SM / P) (items 1, 3, 4, 6, 8, 10 and 11) or if is arousal-seeking/ arousal-avoidance way (AA / AS) (items 2, 5, 7, 9, 12). Small values such as 1, 2 or 3 correspond to telic state, while high values 4, 5 or 6 indicate a paratelic state. The sum of the SM / P scores are in the range of 7 to 42, while the AA / AS scores have a possible result ranging from 5 to 30. Finally, the sum of the two parts returns the overall score, and the final metamotivational state in which work was

carried. The scores for each state are as follows:

SM/P: Telic ≤ 22 , Paratelic ≥ 23 .

AA/AS: Telic ≤ 17 , Paratelic ≥ 18 .

T/PSI: Telic ≤ 40 , Paratelic ≥ 41 .

The test, its rules and distributions, both in english and spanish, are observable up next.

8.2.1 T/PSI questionnaire english version

Below are 12 pairs of words that are opposite. Circle the number you find BETWEEN each pair of words that best indicates how you felt in the LAST MINUTES, just before you start filling out this questionnaire. For example, if the pair was:

Happy

1	2	3	4	5	6
---	---	---	---	---	---

 Sad

And if at that moment the feel was happy, circle the number "1". If on the contrary it was definitely sad, circle the number "6". If you felt a little sad, circle the number "4."

Feeling playful	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Feeling serious-minded
1	2	3	4	5	6			
Wanting peace and quiet	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Wanting adventure
1	2	3	4	5	6			
Trying to accomplish something	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Just having fun
1	2	3	4	5	6			
Doing the activity just for the fun of it	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Doing the activity because it may affect my future
1	2	3	4	5	6			
Wanting to feel excitement	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Wanting to feel calm
1	2	3	4	5	6			
Wanting to be serious	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Wanting to be playful
1	2	3	4	5	6			
Concerned about the future effects of my current activity	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Not concerned about the future effects of my current activity
1	2	3	4	5	6			
Wanting to be playful	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Wanting to accomplish something
1	2	3	4	5	6			
Wanting to feel less aroused	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Wanting to feel more aroused
1	2	3	4	5	6			
Living for the moment	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Focusing on the future
1	2	3	4	5	6			
Feeling serious	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Feeling playful
1	2	3	4	5	6			
Feeling adventurous	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Not feeling adventurous
1	2	3	4	5	6			

8.2.2 T/PSI questionnaire spanish version

A continuación, se presentan 12 pares de palabras que son opuestas. Marque con un círculo el número que se encuentra ENTRE cada par de palabras que mejor indique cómo se sentía en los ÚLTIMOS MINUTOS, justo antes de empezar a llenar este cuestionario. Por ejemplo, si el par era:

Feliz

1	2	3	4	5	6
---	---	---	---	---	---

 Triste

Y si en ese momento se sentía definitivamente feliz, encierre en un círculo el número "1". Si al contrario estaba definitivamente triste, encerrará en un círculo el número "6". Si usted se sentía un poco triste, encerrará en un círculo el número "4."

Sintiendo ganas de jugar	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Sintiéndose serio
1	2	3	4	5	6			
Deseando paz y tranquilidad	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Deseando aventura
1	2	3	4	5	6			
Tratando de lograr algo	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Sólo se divierte
1	2	3	4	5	6			
Haciendo la actividad sólo por el gusto de hacerlo	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Haciendo la actividad, ya que puede afectar mi futuro
1	2	3	4	5	6			
Queriendo sentir emoción	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Queriendo sentir calma
1	2	3	4	5	6			
Queriendo ser serio	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Queriendo ser divertido
1	2	3	4	5	6			
Preocupado	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Despreocupado
1	2	3	4	5	6			
Queriendo tener sólo diversión	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Queriendo lograr algo
1	2	3	4	5	6			
Queriendo sentirse menos motivado	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Queriendo sentirse más motivado
1	2	3	4	5	6			
Viviendo el momento	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Centrándose en el futuro
1	2	3	4	5	6			
Sintiéndose serio	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	Sintiéndose divertido
1	2	3	4	5	6			
Sintiéndose aventurero	<table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6	No sintiéndose aventurero
1	2	3	4	5	6			

8.3 Correlation figures

The following figures provide information about Pearson's correlation and P-value for each cell, comparing individually item per item of the T/PSI questionnaire, by these mean, it is sought to know if there is intentional correlation between the different aspects of the questionnaire (SM / P - AA / AS) or some other type. To check the number, aspect and order of T/PSI item-questionnaire, please review table 1 or annex 8.1.

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11
I2	0,128 0,197										
I3	-0,031 0,761	-0,012 0,908									
I4	0,226 0,023	-0,151 0,133	0,022 0,827								
I5	0,239 0,016	0,556 0,000	-0,164 0,108	0,031 0,760							
I6	0,230 0,019	0,043 0,666	0,227 0,023	0,236 0,016	0,082 0,415						
I7	0,155 0,119	-0,012 0,901	0,208 0,038	0,054 0,592	-0,092 0,363	0,292 0,003					
I8	0,196 0,047	-0,118 0,234	0,382 0,000	0,146 0,144	-0,197 0,048	0,342 0,000	0,329 0,001				
I9	0,137 0,167	0,175 0,077	-0,097 0,338	-0,136 0,176	0,285 0,004	0,185 0,061	0,031 0,754	-0,177 0,074			
I10	0,248 0,011	-0,260 0,008	0,135 0,179	0,068 0,497	-0,244 0,014	0,143 0,149	0,154 0,120	0,468 0,000	-0,264 0,007		
I11	0,547 0,000	0,048 0,635	0,100 0,326	0,144 0,154	0,134 0,186	0,550 0,000	0,376 0,000	0,301 0,002	0,094 0,305	0,120 0,231	
I12	0,351 0,000	0,471 0,000	-0,340 0,001	-0,211 0,035	0,475 0,000	0,136 0,171	0,078 0,433	-0,038 0,433	0,219 0,027	-0,069 0,490	0,332 0,001

Table 3. Analysis of correlation by item of the T/PSI questionnaire. General results.

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11
I2	-0,005 0,979										
I3	-0,345 0,099	0,489 0,015									
I4	0,314 0,135	-0,131 0,543	-0,102 0,643								
I5	0,195 0,351	0,624 0,001	0,256 0,226	0,182 0,396							
I6	0,105 0,617	0,270 0,192	0,199 0,351	0,278 0,188	0,667 0,000						
I7	0,055 0,794	0,251 0,227	0,200 0,350	-0,157 0,463	0,352 0,084	0,059 0,778					
I8	0,319 0,120	0,124 0,554	0,191 0,372	0,341 0,103	0,198 0,342	0,248 0,232	0,222 0,285				
I9	0,071 0,736	0,127 0,545	0,222 0,297	-0,030 0,889	0,338 0,098	0,430 0,032	0,141 0,501	-0,088 0,675			
I10	0,113 0,591	-0,443 0,027	-0,364 0,080	-0,098 0,650	-0,306 0,137	-0,117 0,579	-0,110 0,599	0,444 0,026	-0,060 0,776		
I11	0,242 0,244	0,113 0,589	0,118 0,584	0,213 0,318	0,230 0,268	0,465 0,019	0,105 0,618	0,472 0,017	-0,005 0,981	0,148 0,480	
I12	0,427 0,033	0,265 0,201	-0,329 0,116	-0,078 0,716	0,026 0,903	0,076 0,720	-0,195 0,351	0,089 0,673	-0,092 0,662	0,129 0,539	0,280 0,175

Table 4. Analysis of correlation by item of the T/PSI questionnaire. 1° grade results.

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11
I2	0,025 0,898										
I3	-0,014 0,946	-0,400 0,038									
I4	0,371 0,056	-0,284 0,151	0,346 0,083								
I5	0,142 0,480	0,507 0,007	-0,230 0,258	0,027 0,892							
I6	-0,259 0,183	-0,455 0,015	0,312 0,113	0,191 0,339	-0,387 0,046						
I7	0,072 0,716	-0,044 0,826	0,003 0,987	-0,171 0,395	-0,197 0,326	0,039 0,844					
I8	0,082 0,679	-0,428 0,023	0,306 0,121	0,126 0,532	-0,241 0,225	0,472 0,011	0,373 0,051				
I9	-0,215 0,271	0,691 0,000	-0,251 0,206	-0,373 0,055	0,291 0,140	-0,387 0,042	-0,037 0,850	-0,510 0,006			
I10	0,415 0,028	-0,654 0,000	-0,271 0,171	0,297 0,233	-0,118 0,558	0,137 0,486	0,088 0,656	0,471 0,011	-0,407 0,032		
I11	0,166 0,400	-0,157 0,425	0,182 0,364	0,099 0,623	-0,070 0,727	0,456 0,015	0,595 0,001	0,545 0,003	-0,286 0,140	0,203 0,299	
I12	0,017 0,930	0,600 0,001	-0,623 0,001	-0,558 0,002	0,437 0,023	-0,317 0,100	0,178 0,365	-0,147 0,455	0,448 0,017	-0,348 0,070	0,019 0,923

Table 5. Analysis of correlation by item of the T/PSI questionnaire. 2° grade results.

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11
I2	0,070 0,735										
I3	0,088 0,676	0,247 0,234									
I4	0,295 0,144	-0,055 0,789	-0,297 0,149								
I5	0,185 0,375	0,256 0,216	-0,284 0,179	-0,043 0,840							
I6	0,521 0,006	0,222 0,275	0,241 0,246	0,293 0,146	0,081 0,699						
I7	0,109 0,597	0,138 0,502	0,377 0,063	0,239 0,239	-0,095 0,651	0,623 0,001					
I8	0,413 0,036	0,139 0,497	0,605 0,001	-0,112 0,587	-0,202 0,333	0,325 0,105	0,398 0,044				
I9	0,196 0,336	-0,134 0,514	-0,266 0,198	-0,180 0,380	0,428 0,033	0,238 0,241	-0,118 0,566	0,108 0,600			
I10	0,382 0,054	0,245 0,228	0,159 0,448	-0,059 0,773	-0,147 0,484	0,154 0,453	0,217 0,288	0,351 0,079	-0,189 0,355		
I11	0,759 0,000	0,120 0,567	0,183 0,393	0,275 0,184	0,196 0,358	0,779 0,000	0,409 0,042	0,302 0,143	0,058 0,783	0,180 0,391	
I12	0,420 0,033	0,364 0,068	-0,057 0,787	0,068 0,741	0,778 0,000	0,369 0,063	0,211 0,300	-0,033 0,872	0,359 0,072	0,027 0,897	0,429 0,032

Table 6. Analysis of correlation by item of the T/PSI questionnaire. 3° grade results.

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11
I2	0,265 0,230										
I3	-0,115 0,593	-0,005 0,982									
I4	-0,122 0,571	-0,159 0,458	0,093 0,666								
I5	0,323 0,124	0,778 0,000	-0,179 0,402	-0,001 0,997							
I6	0,211 0,321	0,102 0,637	-0,094 0,664	0,191 0,370	0,162 0,451						
I7	0,306 0,145	-0,284 0,178	0,074 0,730	0,231 0,277	-0,183 0,391	0,119 0,581					
I8	0,014 0,949	-0,185 0,387	0,218 0,306	0,384 0,064	-0,223 0,295	0,231 0,278	0,165 0,441				
I9	0,328 0,117	0,029 0,892	0,016 0,941	0,058 0,789	0,091 0,672	0,356 0,088	0,163 0,448	-0,205 0,336			
I10	-0,084 0,698	-0,330 0,115	0,139 0,518	0,086 0,689	-0,422 0,040	0,170 0,427	0,210 0,325	0,567 0,004	-0,401 0,052		
I11	0,809 0,000	-0,016 0,941	-0,179 0,414	-0,033 0,881	0,102 0,642	0,429 0,041	0,381 0,073	-0,077 0,728	0,450 0,031	-0,164 0,455	
I12	0,568 0,005	0,463 0,026	-0,159 0,468	-0,222 0,308	0,426 0,043	0,487 0,018	0,155 0,479	0,239 0,273	0,013 0,952	0,068 0,757	0,528 0,010

Table 7. Analysis of correlation by item of the T/PSI questionnaire. 4° grade results.

8.4 MIL iDEAS technological drawing contest description

8.4.1 Context

Universidad Técnica Federico Santa María, in association with the Programa de Acompañamiento y Acceso Efectivo a la Educación Superior (PACE) present the contest for the development of technological ideas in the future "MIL iDEAS".

Focused on students from 9° to 12 °grade of the municipal schools attached to the PACE program, which propose is to hold a free drawing competition where students propose ideas - sketch of technological products based on the themes of:

1. Robotics
2. 3D printing
3. Drones
4. Solar energy
5. Virtual Reality

8.4.2 About MIL Ideas

The contest will be held on date and time to be determined, where a total of 5,000

students participating in their schools for one hour and thirty minutes to develop and translate their ideas. Individual sheets "Mil iDEAS", size A3 specially designed for the activity, will be hand over, where student will have to register their name, course, institution and thematic to be treated (one or more of the previously mentioned). Within that period, they must also answer a questionnaire, of twelve items, that will grant the metamotivational state of students in front of the task.

To participate, students must submit their "Mil iDEAS" sheet within the stipulated time, with the corresponding sketch, their personal data and the selection of themes on the front side, in conjunction with the total of responses to the questionnaire located at the right side of the sheet. Only students who meet the above will be participating in their respective categories for the prize of a Computer or Tablet.

8.4.3 Pilot

The pilot test seeks to recreate the conditions prior the development of the MIL iDEAS contest, in order to evaluate conditions, in addition to the metamotivational behavior of the students

in front of a drawing activity, with a technological theme, in a ludic context. It considers a total of at least 100 students between the ages of 14 and 18 and will have a duration of approximately 30 to 45 minutes, (not necessary at the same time in all courses). All materials, as well as the explanation and preparation for this contest will be delivered by the coordination team of the same, and likewise, will be withdrawn after the stipulated time.

The following materials will be handed to students:

- 1 drawing MIL iDEAS sheet
- 1 pencil
- 1 pen
- 1 eraser

The following is the design of the drawing sheets:



The image shows a drawing sheet for the MIL iDEAS contest. The sheet is white with a blue border. On the left side, there is a circular logo with the text 'MIL iDEAS' and a stylized drawing of a hand holding a pencil. The main area of the sheet is a large white space with the text 'MIL iDEAS' and a faint drawing of a hand holding a pencil. On the right side, there is a blue section titled 'Questionario:' containing a questionnaire with several questions and checkboxes. At the bottom of the sheet, there is a blue section with a form for personal information, including fields for 'Nombre:', 'Apellido:', 'Institución:', 'Correo:', 'Teléfono:', and 'Contacto:'. There are also logos for 'MIL iDEAS', 'CONADEP', and 'COMAR' at the bottom right.

Figure 8. MIL iDEAS drawing sheet.

This sheet includes a questionnaire to assess the status of students while doing this activity, this corresponds to a questionnaire (T / PSI) and seeks to reflect if students develop their drawings in a state Telic (serious) or Paratelic (spontaneous). The questionnaire includes an explanation of how it should be developed at its upper end, but such instructions will be also explained at the beginning of the contest. T/PSI questionnaire can be observed in figure 9.

Questionario:

A continuación, se presentan 12 pares de palabras que son opuestas. Marque con un círculo el número que se encuentra ENTRE cada par de palabras que mejor indique cómo se sentía en los ÚLTIMOS MINUTOS, justo antes de empezar a llenar este cuestionario. Por ejemplo, si el par era:

Feliz 1 2 3 4 5 6 Triste

Y si en ese momento se sentía definitivamente feliz, encierre en un círculo el número "1". Si al contrario estaba definitivamente triste, encerrará en un círculo el número "6". Si usted se sentía un poco triste, encerrará en un círculo el número "4."

Sintiendo ganas de jugar	1 2 3 4 5 6	Sintiéndose serio
Deseando paz y tranquilidad	1 2 3 4 5 6	Deseando aventura
Tratando de lograr algo	1 2 3 4 5 6	Sólo se divierte
Haciendo la actividad sólo por el gusto de hacerlo	1 2 3 4 5 6	Haciendo la actividad, ya que puede afectar mi futuro
Queriendo sentir emoción	1 2 3 4 5 6	Queriendo sentir calma
Queriendo ser serio	1 2 3 4 5 6	Queriendo ser divertido
Preocupado	1 2 3 4 5 6	Despreocupado
Queriendo tener sólo diversión	1 2 3 4 5 6	Queriendo lograr algo
Queriendo sentirse menos motivado	1 2 3 4 5 6	Queriendo sentirse más motivado
Viviendo el momento	1 2 3 4 5 6	Centrándose en el futuro
Sintiéndose serio	1 2 3 4 5 6	Sintiéndose divertido
Sintiéndose aventurero	1 2 3 4 5 6	No sintiéndose aventurero

Figure 9. T/PSI questionnaire

8.5 Test pilot record

The pilot test was carried out at Saint Paul's College, located at Merced Street # 56, Viña del Mar, Valparaíso, Chile. It lasted a total of four days, each grade was evaluated a different date, being these 21, 22, 24 and 28 of March 2017. Such days were granted by the school organization, according to each grade availability.

8.5.1 Informative record

The following figures provide information on the activity performed in each course.

MIL iDEAS - 9° Grade - Assistant professor: Sergio Cabrera

About the activity:

Date	March 24, 2017
Present students	25
Total students enrolled	26
Activity start time	9:32 am
Instructions time	8 min 29 sg
Activity end time	10:15 am

About drawing sheets:

Total sheets delivered	25
Total sheets received	25
Total sheets received with personal information completed	25
Total sheets received with completed drawings	25
Total sheets received with T/PSI questionnaire completed	23
Total sheets received correctly completed	23

Table 8. Pilot information record, 9° grade.

MIL iDEAS - 10° Grade- Assistant professor: Marcela Leyton

About the activity:

Date	March 28, 2017
Present students	28
Total students enrolled	28
Activity start time	10:33 am
Instructions time	11 min
Activity end time	11:15

About drawing sheets:

Total sheets delivered	28
Total sheets received	28
Total sheets received with personal information completed	28
Total sheets received with completed drawings	28
Total sheets received with T/PSI questionnaire completed	26
Total sheets received correctly completed	26

Table 9. Pilot information record, 10° grade.

MIL iDEAS - 11° Grade - Assistant Professor: Sergio Varela

About the activity:

Date	March 21, 2017
Present students	27
Total students enrolled	29
Activity start time	12:15 pm
Instructions time	9 min 6 seconds
Activity end time	12:55 pm

About the sheets:

Total sheets delivered	27
Total sheets received	27
Total sheets received with personal information completed	27
Total sheets received with completed drawings	27
Total sheets received with T/PSI questionnaire completed	23
Total sheets received correctly completed	23

Table 10. Pilot information record, 11° grade.

**MIL IDEAS - 12° Grade - Assistant
Professor: Francisco Navarro**

About the activity:

Date	March 22, 2017
Present students	24
Total students enrolled	26
Activity start time	8:54 am
Instructions time	6 min 31 seconds
Activity end time	9:27 am

About the sheets:

Total sheets delivered	24
Total sheets received	24
Total sheets received with personal information completed	24
Total sheets received with completed drawings	24
Total sheets received with T/PSI questionnaire completed	23
Total sheets received correctly completed	23

Table 11. Pilot information record, 12° grade.

8.5.2 Photographic record

Below are images as a photographic record of the pilot activity on the days when it was carried out.



Figure 10. Materials submitted for pilot testing.



Figure 11. Student drawing, pilot test.



Figure 12. Group of students working, pilot test.



Figure 13. Classroom preparation, pilot test.

8.6 MIL iDEAS technological drawing contest graphic record

The following report presents the progress of graphic works carried out for the "MIL iDEAS" contest in the period between May and December 2016. The series of proposals for the development of the corporate image and advertising of the competition and their evolution are presented below.

All proposals have been developed under the tutelage of Professor Christopher Nikulin.

8.6.1 Imagetype development

There were 3 initial proposals, all with their corresponding typography and color range, they can be review up next.

Propuesta 1:

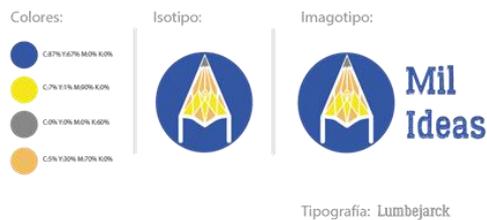


Figure 14. First imagetype proposal

Propuesta 2:



Figure 15. Second imagetype proposal

Propuesta 3:



Figure 16. Third imagetype proposal

From the previous ones, the proposal 2 was selected, for its continuous development in search of a more agreed logo. The following was selected as the contest imagetype. The design was made by hand and posteriorly digitalized.



Figure 17. MIL iDEAS contest imagetype and technical information.



Figure 18. MIL iDEAS contest imagetype, color variations.

Once selected the logo and the range of colors to be used, we proceeded to begin with the development of the "Mil iDEAS" sheets, size A3, which will be given to the contestants for drawing making and as the evaluation tool that contains the T/PSI questionnaire.

8.6.2 Drawing sheets

Originally it was discussed that the sheets would contain information on both front face, where the contestant would enter his personal information and make the drawing, as on his back, where a questionnaire of twelve items would be presented for the student to respond, which would be used for the purposes of study that later involves the contest. The proposals were as follows:



Figure 19. MIL iDEAS first sheet proposal, front face.



Figure 20. MIL iDEAS first sheet proposal, back face.



Figure 21. MIL iDEAS second sheet proposal, front face.



Figure 22. MIL iDEAS second sheet proposal, back face.

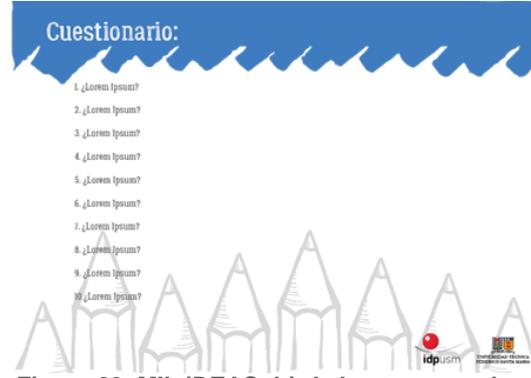


Figure 23. MIL iDEAS third sheet proposal, back face.

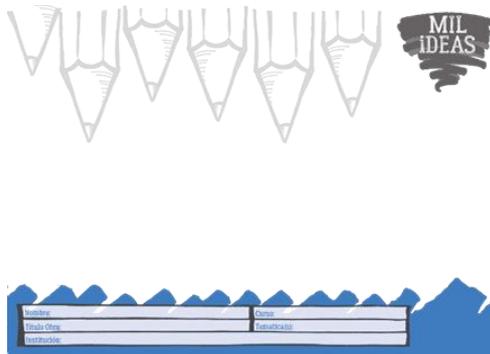


Figure 24. MIL iDEAS third sheet proposal, front face.

Finally, after a few corrections the design was selected, and presented in the same variables colors that were previously showed in imagetype logo. The official sheets design for the contest are showed below.



7° - 8° Básico:



Cuestionario:

A continuación, le presentamos 12 pares de palabras que son opuestas. Marque con un círculo el número que se encuentra ENTRE cada par de palabras que mejor indique cómo se siente en los ÚLTIMOS MINUTOS, justo antes de empezar a firmar este cuestionario. Por ejemplo, si el par era:

Feliz 1 2 3 4 5 6 Triste

Y si en ese momento se siente definitivamente feliz, encierra en un círculo el número "1". Si al contrario estaba definitivamente triste, encierra en un círculo el número "6". Si usted se siente un poco triste, encierra en un círculo el número "4".



Sintiendo ganas de jugar	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Sintiendo algo	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6
Disfrutando por y disfrutando	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Disfrutando	Disfrutando
Tratando de lograr algo	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Solo se	Solo se
Haciendo la actividad solo por el gusto de hacerlo	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Haciendo la actividad, ya que puede afectar el futuro	Haciendo la actividad, ya que puede afectar el futuro
Queriendo sentir emoción	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Queriendo sentir calma	Queriendo sentir calma
Queriendo ser serio	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Queriendo ser divertido	Queriendo ser divertido
Preocupado	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Despreocupado	Despreocupado
Queriendo tener solo diversión	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Queriendo lograr algo	Queriendo lograr algo
Queriendo sentirme menos motivado	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Queriendo sentirme más motivado	Queriendo sentirme más motivado
Valorando el momento	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Centrándome en el futuro	Centrándome en el futuro
Sintiendo ser serio	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	Sintiendo ser divertido	Sintiendo ser divertido
Sintiendo ser aventurero	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6	No sintiendo ser aventurero	No sintiendo ser aventurero

Nombre:	Curso:
Título Obra:	Temática(s):
Institución:	Contacto:



Figure 25. MIL IDEAS official sheet, first group.



1° - 2° Medio:



Cuestionario:

A continuación, se presentan 12 pares de palabras que son opuestas. Marque con un círculo el número que se encuentra ENTRE cada par de palabras que mejor indique cómo se siente en los ÚLTIMOS MINUTOS, justo antes de empezar a llenar este cuestionario. Por ejemplo, si el par era:

Feliz 1 2 3 4 5 6 Triste

Y si en ese momento se sentía definitivamente feliz, encierre en un círculo el número "1". Si al contrario estaba definitivamente triste, encerrará en un círculo el número "6". Si usted se sentía un poco triste, encerrará en un círculo el número "4".

Sintiéndose ganas de jugar	1 2 3 4 5 6	Sintiéndose serio	1 2 3 4 5 6
Deseando paz y tranquilidad	1 2 3 4 5 6	Deseando aventura	1 2 3 4 5 6
Tratando de lograr algo	1 2 3 4 5 6	Sólo se divierte	1 2 3 4 5 6
Haciendo la actividad sólo por el gusto de hacerlo	1 2 3 4 5 6	Haciendo la actividad ya que puede afectar mi futuro	1 2 3 4 5 6
Queriendo sentir emoción	1 2 3 4 5 6	Queriendo sentir calma	1 2 3 4 5 6
Queriendo ser serio	1 2 3 4 5 6	Queriendo ser divertido	1 2 3 4 5 6
Preocupado	1 2 3 4 5 6	Despreocupado	1 2 3 4 5 6
Queriendo tener sólo diversión	1 2 3 4 5 6	Queriendo lograr algo	1 2 3 4 5 6
Queriendo sentirse menos motivado	1 2 3 4 5 6	Queriendo sentirse más motivado	1 2 3 4 5 6
Viviendo el momento	1 2 3 4 5 6	Centrándose en el futuro	1 2 3 4 5 6
Sintiéndose serio	1 2 3 4 5 6	Sintiéndose divertido	1 2 3 4 5 6
Sintiéndose aventurero	1 2 3 4 5 6	No sintiéndose aventurero	1 2 3 4 5 6

Nombre:

Curso:

Título Obra:

Temática(s):

Institución:

Contacto:



Figure 26. MIL IDEAS official sheet, second group.



3° - 4° Medio:



Cuestionario:

A continuación, se presentan 12 pares de palabras que son opuestas. Marque con un círculo el número que se encuentra ENTRE cada par de palabras que mejor indique cómo se sentía en los ÚLTIMOS MINUTOS, justo antes de empezar a llenar este cuestionario. Por ejemplo, si el par era:

Feliz 1 2 3 4 5 6 Triste

Y si en ese momento se sentía definitivamente feliz, epiere en un círculo el número "1". Si al contrario estaba definitivamente triste, encerrará en un círculo el número "6". Si usted se sentía un poco triste, encerrará en un círculo el número "4."

Sintiendo ganas de jugar	1 2 3 4 5 6	Sinténdose serio	1 2 3 4 5 6
Deseando paz y tranquilidad	1 2 3 4 5 6	Deseando aventura	1 2 3 4 5 6
Tratando de lograr algo	1 2 3 4 5 6	Sólo se divierte	1 2 3 4 5 6
Haciendo la actividad sólo por el gusto de hacerlo	1 2 3 4 5 6	Haciendo la actividad, ya que puede afectar mi futuro	1 2 3 4 5 6
Quiriendo sentir emoción	1 2 3 4 5 6	Quiriendo sentir calma	1 2 3 4 5 6
Quiriendo ser serio	1 2 3 4 5 6	Quiriendo ser divertido	1 2 3 4 5 6
Preocupado	1 2 3 4 5 6	Despreocupado	1 2 3 4 5 6
Quiriendo tener sólo diversión	1 2 3 4 5 6	Quiriendo lograr algo	1 2 3 4 5 6
Quiriendo sentirse menos motivado	1 2 3 4 5 6	Quiriendo sentirse más motivado	1 2 3 4 5 6
Viviendo el momento	1 2 3 4 5 6	Centrándose en el futuro	1 2 3 4 5 6
Sintiendo ser serio	1 2 3 4 5 6	Sintiendo divertido	1 2 3 4 5 6
Sintiendo a aventurero	1 2 3 4 5 6	No sintiendo a aventurero	1 2 3 4 5 6

Nombre: _____

Curso: _____

Título Obra: _____

Temática(s): _____

Institución: _____

Contacto: _____



Figure 27. MIL IDEAS official sheet, third group.

8.6.3 Work Folder

In order to protect the material for the development of the contest (MIL iDEAS drawing sheets) is that a folder was designed which, as mentioned previously, seeks to grant protection to the material prior to its use, and on the other hand seeks to be a merchandising product of the contest for the students, since it will remain in its possession once the activity is finished.

The following figure work as a sample, the layout corresponds to the folder for first group.

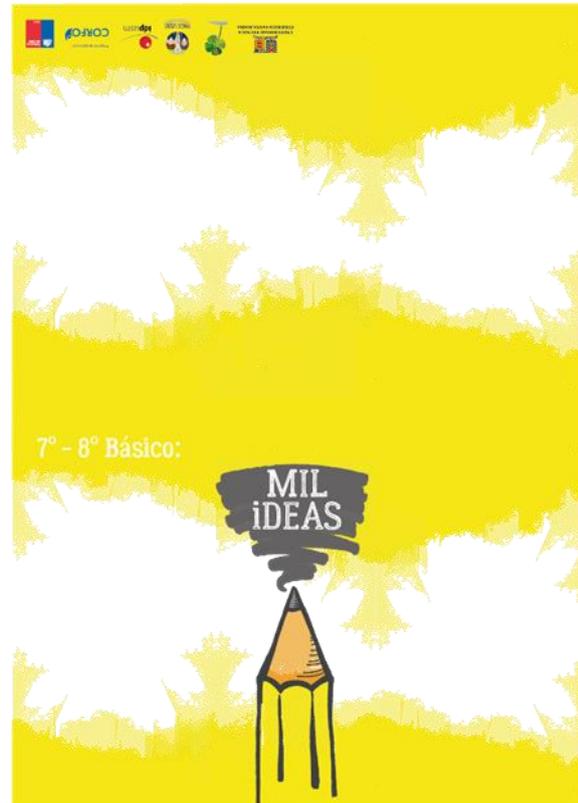


Figure 28. MIL iDEAS work folder, first group sample.

8.6.4 Poster design

In the same line of diffusion of the contest is that a poster is designed which seeks to be present in all schools where the activity will be developed. This is still in the process of approval, but below are the designs presented and the progress made



Figure 29. Poster design, first proposal.



Figure 30. Poster design, second proposal.

8.6.5 Web page mockup

As a platform for the publicity, information, presentation of the bases, and the gallery of promotional videos is that it begins to develop the official website www.concursomilideas.cl by the company Unelab. This project is being carried out by the Engineer in Product Design and part-time Professor of the same career Vicente Arenas, jointly with the designer of the competition Laura Palma and under the tutelage of Professor Christopher Nikulin. See figure 25.

8.6.6 Publicity videos

After a brief study, the generation of an official script and a pair of meetings with the YouTuber Eduardo Piñones, the first pilot video was made to advertise the drawing contest, with a duration of 1 minute and 14 seconds. The thematic of this video are robots, showing through images the evolution that has occurred in the last 20 years. A sample of the video is shown in figure 36.



Figure 31. Web page mockup

8.7 Merchandising costs

Seeking the contest would be the most memorable possible is that a series of costs evaluations have been made in post to offer souvenirs to the contestants, which also promote the activity and generate expectation on behalf of the participants. The final chosen products can be check out in figure 34.

ARTÍCULO	Contacto	Detalle cotización	Cantidades	Valor Unitario	Valor total	Observaciones
Carpetas	http://www.migrafica.cl	6.500 carpetas tamaño A3 con logos impresos MEDIDAS: 42,9 x 29,7 CM	50		\$305	\$ 1.982.000 + Iva Tiempo de producción: 15 días hábiles aprox.
Eco Bolsas	www.pronegalos.cl	6.500 Bolsa Ecologica Mediana código ec110	6.500	\$518		\$3.367.000 Incluye Impresión de un Logotipo a un Color/ Medidas Pícto 25 x 30 x 8 cm / Asas 28 cm c/u aprox.
	http://www.store.eyes.cl	Bolsa Ecologica Mediana 25x30x8 (TBCOE3): 6.500 unidades.	6.500	\$358		\$2.327.000 Incluye impresión de logo a 1 color
	http://www.zonapromo.cl/	Bolsas ECO 25x30x8, código 2033	6.500	\$352		\$2.288.000
	http://www.zonapromo.cl/	Bolsas ECO 25x30x8, código 2033	6.500	\$320		\$2.080.000 SÓLO 1 COLOR DE IMPRESIÓN
	www.pronegalos.cl	Bolsa Ecologica con Fuelle (ec: 119) MEDIDAS 40X30X12	6.500	\$510		\$3.315.000 SÓLO 1 COLOR DE IMPRESIÓN
Lápiz grafito (grande)	http://www.zonapromo.cl/productos/eco-30x40x12cm/	BOLSA ECO 30X40X12CM	6.500	\$684		\$4.448.000 Valor neto, no incluye Iva FULL COLOR
	http://www.zonapromo.cl/productos/eco-30x40x12cm/	BOLSA ECO 30X40X12CM	6.500	\$366		\$2.379.000 1 sólo color de impresiónValor neto, no incluye Iva
Lápiz grafito (corto)	www.pronegalos.cl	6.500 con logo impreso (más despacho) código ec110	6.500			\$0
	http://www.icismkt.cl/	6500 con logo impreso código 10501	6.500			\$0
	http://www.store.eyes.cl/	Lápiz Grafito Largo (TL26): 6.500 unidades	6.500	\$107		\$695.500
Set lápices colores	www.pronegalos.cl	6.500 con logo impreso (más despacho) código ec056	6.500	\$100		\$650.000
	http://www.store.eyes.cl/	Lápiz Grafito Corto (TL27): 6.500 unidades.	6.500	\$97		\$630.500
Set escolar ecológico (regla, 3 lápices mina, goma y sacapuntas)	http://www.icismkt.cl/	6.500 (7 colores) (en cilindro) código 10505	6.500			\$0
	http://www.store.eyes.cl/	Set 6 Lápices Colores (TL29): 6.500 unidades.	6.500	\$500		\$3.250.000
	http://www.zonapromo.cl/	SET DE 6 LAPICES COLORES NIÑO código 808	6.500	\$360		\$2.340.000 Precio indicado: \$2.340.800 Valores netos, no incluyen IVA
Set escolar ecológico (regla, 3 lápices mina, goma y sacapuntas)	www.pronegalos.cl	6.500. Logotipo impreso a un color, código ec086	6.500	\$795		\$5.167.500 Incluye Impresión de un Logotipo a un Color en el estuche
	http://www.store.eyes.cl/	Set Escolar Ecológico (TL86): 6.500 unidades.	6.500	\$867		\$5.635.500
	http://www.zonapromo.cl/	Set Ecológico código 7502	6.500	\$640		\$4.160.000 Valores netos, no incluyen IVA.
	http://www.store.eyes.cl/	Cuaderno Eco Tapo Dura (TN18): 300 unidades.	300	\$2.186		\$655.800

Figure 32. Merchandising costs evaluation.

Productos a Comprar								
Artículo	Medidas	Empresa	Contacto	Unidades	Valor por unidad	Valor Total	Tiempo de manufactura	TOTAL MÁS IVA
Carpetas contenedoras Hojas A3	cerrada de 42,6 x 30,6 cm abierta de 42,6 x 80 cm. Impresión offset color por caras exteriores, mas un barniz protector, en papel couché de 300 grs. con un pliegado y dobladas.	Mi gráfica	http://www.migrafica.cl/	6.250	\$382	\$ 2.380.000 + Iva	15 días hábiles aprox.	\$2.282.220
Carpetas contenedoras Hojas A3	troquelado (cortes para corchetes)	Mi gráfica	http://www.migrafica.cl/	6.250	\$371	\$ 2.450.000 + Iva	15 días hábiles aprox.	\$2.319.072
Hojas A3	tamaño de 42 x 29,7 cm. Impresión offset color por una cara. PAPEL HILADO N°6	Mi gráfica	http://www.migrafica.cl/	6.250	\$105	\$ 695.000 + Iva	9 a 10 días hábiles aprox.	\$657.982
Hojas A3	tamaño de 42 x 29,7 cm. Impresión offset color por una cara. PAPEL HILADO 90 GRS.	Mi gráfica	http://www.migrafica.cl/	6.250	\$100	\$ 658.000 + Iva	9 a 10 días hábiles aprox.	\$622.813
Eco Bolsas 30x40x12 cm	Impresión Full Color	Zonapromo	www.zonapromo.cl	6.250	\$684	\$4.446.000	Primer tramo despacho en 7 días	\$4.273.290
Eco Bolsas 30x40x12 cm	Impresión 1 sólo color	Zonapromo	www.zonapromo.cl	6.250	\$388	\$2.378.000	Primer tramo despacho en 7 días	\$2.298.686
Lápiz grafito	LAPIZ GRAFITO N2 EVOLUTION BIC HEXAGONAL. Sin impresión	Ofmarket	www.ofmarket.cl	6.250	\$108	\$567.000	Costo despacho (2.500 más IVA)	\$674.730
Goma de borrar	GOMA DE MIGA PROCARTE GRANDE 36 SOFT	Ofmarket	www.ofmarket.cl	6.250	\$80	\$420.000	Costo despacho (2.500 más IVA)	\$488.800
Set Triangular Lápices de colores	SET DE 8 LAPICES COLORES NIÑO código 8081	Zonapromo	www.zonapromo.cl	6.250	\$380	\$2.340.000	Primer tramo despacho en 7 días. Precio sin IVA	\$2.248.100
								\$8.830.287
								POSSIBLE PRESUPUESTO

Figure 33. Chosen merchandising costs and specifications.