A Didactic Model for Stimulating Creative Thinking in First-Semester Graphic Design Students

Modelo didáctico para estimular el pensamiento creativo en los estudiantes de Diseño Gráfico de primer semestre

Adolfo Guzmán Lechuga
FIRST AUTHOR
CONCEPTUALIZATION – INVESTIGATION
VISUALIZATION – WRITING – DRAFTING
REVIEW AND EDITING
adolfo.guzman@ulsasaltillo.edu.mx
Universidad Autónoma de Coahuila
Saltillo, Coahuila, México
ORCID: 000-0003-4238-704X

María del Socorro Gabriela Valdez Borroel
SECOND AUTHOR AND CORRESPONDING AUTHOR
METHODOLOGY – DATA CURATION – ANALYSIS
PROJECT ADMINISTRATION
mvaldez@uadec.edu.mx
Universidad Autónoma de Coahuila
Saltillo, Coahuila, México
ORCID: 0000-0002-8627-0137

José Ángel Muñiz Flores
THIRD AUTHOR
VALIDATION – SUPERVISION – WRITING AND INVESTIGATION
amuniz@uadec.edu.mx
Universidad Autónoma de Coahuila
Saltillo, Coahuila, México
ORCID: 0000-0003-0076-234X

Received: April 11, 2024
Accepted: August 3, 2024
Published: May 21, 2025

Abstract

This paper integrates the theories of Lateral Thinking (De Bono, 1989) and Multiple Intelligences (Gardner, 1983, as cited in Armstrong, 2017) into a model designed to offer first-semester Graphic Design students a dynamic and functional learning approach. The model aims to help students tackle contemporary design challenges by fostering the development of telycally grounded proposals that involve unconventional yet applicable solutions. The proposed didactic model seeks to contribute to the activation of creative thinking through teaching strategies based on lateral thinking, enhancing linguistic, spatial, interpersonal, and intrapersonal intelligence.

Didactic model, creative thinking, Graphic Design

Resumen

El presente trabajo relaciona las teorías de El Pensamiento Lateral (De Bono, 1989) y Las Inteligencias Múltiples (Gardner, 1983, citado por Armstrong, 2017), en un modelo que ofrece a los estudiantes de Diseño Gráfico de primer semestre un aprendizaje dinámico y funcional, así como una forma de abordar los problemas del diseño actual, a fin de que logren proponer productos de fundamento telesico con soluciones inusuales y aplicables. La propuesta es un modelo didáctico que aspira a contribuir con la activación del pensamiento creativo, mediante didácticas basadas en el pensamiento lateral, y que elevan los niveles de las inteligencias lingüística, espacial, interpersonal e intrapersonal.

Palabras clave: Modelo didáctico, pensamiento creativo, diseño Gráfico

Introduction

The didactic model for stimulating creative thinking in first-semester Graphic Design students proposes pedagogies in which outcomes are unpredictable, although these are not the only aspect of importance—the process itself also holds value, as some scholars have suggested.

Stimulating creativity involves helping students develop thinking skills. If educators wish to contribute to this process, they must create opportunities for experimentation, thereby enabling the reimagining of what appears to be already defined. This involves exploring new and unusual pathways to problem-solving with interest and curiosity. Such an environment fosters the development of risk-taking and decision-making abilities based on the outcomes achieved. To this end, educators must identify students' strengths and positive traits, so that learners are able to regard results as learning experiences.

The model aims to serve as a support tool for educators seeking to encourage students in formulating inventive proposals; its purpose is to raise the level of creative thinking by applying lateral thinking techniques, while simultaneously enhancing linguistic, visuospatial, intrapersonal, and interpersonal intelligences in a setting that applies the principles of positive psychology.

The components of the didactic model are:

Knowing: The ability to identify problems, mastery of analysis and evaluation, decision-making skills, and the ability to combine concepts and propose solutions.

Doing: The ability to express oneself orally, in writing, and visually.

Being: The capacity to work collaboratively in teams and to adopt an optimistic attitude.

The work presented here corresponds to the theoretical foundation. The implementation and results will be reported in a future study. To provide the reader with an idea of how the model functions, a diagram has been included (Figure 1).

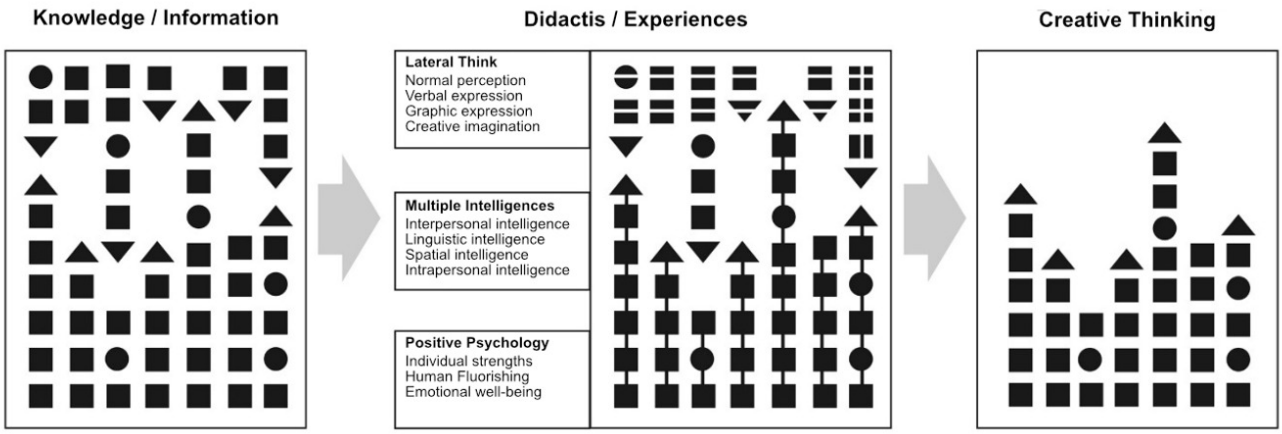

Figure 1. *Operation of the didactic model to stimulate creative thinking. Example of the process and application of creative thinking.*
Source: Created by the author, inspired by Knowledge, Experience, and Creativity, by Hugh MacLeod.

Fundamental Theoretical Concept

From the perspective of creative thinking, specific knowledge or expertise in a particular area will be of little use if it cannot be linked to knowledge from other fields, as failing to connect knowledge hinders the generation of innovative ideas.

Didactic techniques, viewed as experiences, present an opportunity to acquire knowledge and achieve learning. The foundation of creative thinking development suggests that applying accumulated knowledge to new situations enables the formation of connections and the construction of new knowledge. In this way, didactic techniques related to lateral thinking, multiple intelligences, and positive psychology offer new experiences for students to develop the ability to connect prior knowledge with new concepts.

Creativity and Creative Thinking

Addressing today's challenges requires a type of thinking that can find inventive solutions to the increasingly complex situations created by the demands of the modern world. Within educational institutions, it is crucial that students are prepared with an attitude of interest in proposing solutions to the problems faced by current societies in all their environments. This requires that educators be the first to acknowledge the need to equip students with the tools and skills necessary for this. The way of thinking will be the determining factor for new generations to develop the attitude to address the dilemmas they encounter.

In this context, creative thinking emerges not only as the determining factor in an individual's adaptation to the demands of technological and

economic development but also in the process of personal maturation and well-being, as it provides tools to face everyday challenges (Souza & Silva, 2021).

Creative thinking is distinguished by formulating unusual solutions and also because it activates different thinking skills, encouraging individuals to develop a different worldview and, consequently, act differently upon reality. Thus, this type of thinking becomes a complex dimension of human behavior, encompassing various aspects of a person: from basic processes (such as perception) to more complex processes (such as mental organization and information processing), as well as other aspects like motivation and openness to experience and feelings (Cropley, 2015, as cited in Souza & Silva, 2021). Creative thinking values creativity because it is a form of divergent thinking that reflects an individual's capacity to generate new models, novel, unusual, and original responses, as opposed to convergent thinking, which is more rational, sequential, and logical (Guilford, 1950, as cited in Sabag, 1989).

It is true that all human beings have a natural disposition to create and are, by nature, creative because this is a human characteristic. However, there are individuals with a special predisposition for creative thinking, endowed with the ability to generate unusual solutions on their own initiative, while the rest can train themselves to develop creative thinking. From an educational perspective, this distinction is relevant because it assumes that creative thinking exists naturally in students, but also indicates that while there are individuals with exceptional creative abilities, most students must train through programs with specific activities for the types of problems they will face. Many of these courses are based on alternating convergent and divergent thinking and vary in duration: ranging from short eight-session, two-hour courses with adults to several academic semesters on school subjects for children (Dempster et al., 2017, cited by Souza and Silva, 2021).

The creative skills taught in educational institutions will be the factor that distinguishes students equipped to face the challenges of the present. It could be said that this is a global trend in education, as reflected in the Incheon Declaration of the World Education Forum, held in Incheon, South Korea, with a vision toward 2030. It states that "quality education fosters creativity and knowledge, ensuring the acquisition of competencies" (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2015, p. 17). Under this argument, we can consider creative thinking a basic competency that the educational system must develop, as it promotes the multifaceted development of students and capitalizes on an individual's ability to solve problems. This skill can be learned and developed in an educational environment, not only in the arts but across all areas of the curriculum; however, educators do not seem to prioritize the development of this type of thinking in their teaching (Carranza, 2021).

Stimulating creative thinking requires the enthusiastic participation of institutions and educators. Although students have a defined way of thinking, educational models and teaching methods are factors that may further restrict the development of creative thinking. Training in this thinking should not be considered a magic formula, as it is an attitude and a habit that must be cultivated for its development, and both the educator and the student must be aware of this and not wait for moments of revelation or enlightenment.

To highlight the significance of creative thinking as the means to generate innovative solutions, consider the story of "the little stones" proposed by De Bono (1989):

> A long time ago, when a person could be imprisoned for debt, a merchant in London was unfortunate enough to owe a large sum to a moneylender. The moneylender, who was old and unattractive, was fond of the merchant's beautiful teenage daughter. He proposed a deal. He said that he would cancel the debt in exchange for the merchant's daughter.
>
> Both the merchant and his daughter were horrified by the proposal. The crafty moneylender then suggested that Providence should decide. He said that he would put one black stone and one white stone into an empty bag, and the girl would have to draw one of the stones. If she drew the black one, she would become his wife, and the father's debt would be canceled. If she drew the white one, she would remain with her father, and the debt would also be canceled. However, if she refused to draw a stone, the father would go to prison, and she would starve to death.
>
> The merchant reluctantly agreed. They were walking along a path covered with little stones in the merchant's garden when the moneylender bent down to pick up the two stones. While doing so, the girl, her vision sharpened by fear, noticed that he had taken two black stones and placed them in the bag. He then asked the girl to draw the stone that would decide her and her father's fate. (p. 149)

If we put ourselves in the girl's place, what decision would we make? What could we do? How would we resolve the situation? From the perspective of logical thinking, one would have to sacrifice oneself for the moneylender. But what possibilities would there be from the perspective of creative thinking? The situation was resolved as follows:

The girl reached into the bag and drew one of the stones but dropped it on the path, losing it among the others. She justified herself, saying, "How clumsy, I dropped the stone, but don't worry, look in the bag, and by the color of the stone that remains, you'll know what color the one I took was, and I clumsily dropped it on the ground." (p. 150)

> The stone left in the bag is black, so it is understood that the one she took was white, and the moneylender would not dare admit his dishonesty. Thus, the situation changed from being highly disadvantageous to favorable. The example shows how the use of creative thinking makes possible what, in logical thinking, seems to have no alternative solution.

Teachers ask students for alternatives to solve problems. For the student, fulfilling the request has no relevance because it is not difficult to come up with a proposed solution, no matter what it is. Their ideas and decision-making in response to problems are simply based on fulfilling the request, regardless of the relevance of the proposal or how it was arrived at. In relation to this, an important question arises: Who is responsible for this situation: the student, the institutions and their educational models, or the teachers and their teaching methods? Perhaps the answer to this question lies in what De Bono (1986) said about lateral thinking and education. He stated that teaching seeks systematic solidity in ideas, therefore:

> Facts and procedures for drawing correct deductions from them are valued. One thus learns to think correctly, developing a special sensitivity toward everything that is incorrect or illogical, which causes ideas that lack a solid foundation or contradict other premises to be automatically discarded, guiding the chaining of ideas toward concepts that are susceptible to logical demonstration. (p. 68)

What De Bono (1986) argues is a call for teachers to reflect: What type of thinking are they fostering in students? How much do they stimulate creativity in them? Are they only seeking students to complete tasks? Are the solutions proposed by students to the problems innovative? Should the paradigm of the "model" student and educational systems be changed? Perhaps the argument that can answer these questions lies in the support that educational institutions give to both teachers and students, in terms of fostering an educational environment where teaching methods are oriented toward nourishing talent and motivations, as well as rewarding student achievements.

In this idea, Gardner (1983, cited by Armstrong, 2017) in his theory of multiple intelligences proposed stimulating abilities such as spatial intelligence (through sculpture or painting), kinesthetic intelligence (through dance, athletics, or any physically challenging and rewarding activity), and linguistic intelligence (through narrative). These efforts allow for the identification of talents not typically found in traditional academic subjects and stimulate the abilities Gardner (1983, cited by Armstrong, 2017) suggests. In this sense, if teachers wish to stimulate students' creativity, they must allow more freedom for experimentation, which will lead students to explore with interest the unusual paths awakened by curiosity. This will be the environment that encourages the search and adventure of taking risks and making decisions based on the results obtained.

Lateral Thinking in the Classroom

According to De Bono (1986), lateral thinking can be taught from basic education through to higher education. It is recommended that its practical application be habitual and persist throughout an individual's learning process. In this way, the ability to use information to form new models for contexts that require them will be developed.

Lateral thinking is closely related to creativity due to its insightful solutions, which arise from restructuring existing models. The significance of this relationship is not only in the achieved result but in that the process of arriving at astute solutions can be known and described. In other words, as a creative process, it can be learned and consciously applied. This makes lateral thinking a method that fosters new, clever solutions, without the aura of a casual phenomenon, as precise techniques enable its development.

One of the goals of lateral thinking is the generation of new ideas that provoke change or progress. To achieve this, it must break with old ideas in order to stimulate new ones. The use of lateral thinking functions to restructure and flexibilize models, testing other approaches, provoking new attitudes, and questioning concepts that are considered immutable.

It is no surprise that educational institutions cultivate logical or vertical thinking. In the opinion of creativity experts, while it is useful to address this type of thinking, it should be complemented with the qualities of lateral thinking. This does not mean that one is better than the other, nor that there is antagonism between them. The truth is that both are indispensable, as they complement each other.

It is said that logical thinking can grow by applying the techniques of lateral thinking, as it softens the rigidity of ideas generated by logical thought. Experts believe this idea is expanding in the teaching fields at all educational levels. It is thought that, at some point, it will become a fundamental aspect of teaching programs due to its effectiveness in solving real-life and professional problems.

It is important to mention that there is a widespread notion: logical or vertical thinking is the most effective way to propose solutions to problems. This way of thinking has been predominant at all educational levels, while lateral thinking has been little used for the same purposes. To clarify their articulation, the differences and identity of each of the thinking types in question are presented below, according to De Bono (1986) (Table 1).

Table 1. Differences between lateral thinking and vertical thinking

Variable 1	Variable 2
• It is creative • Moves to create a direction • It is provocative • Can make leaps • Does not need to be a analytical • No path is rejected • Explores what seems completel inrelated to the topi • Categories, classifications, and labels are not fixed • Follow less obvius paths • It is a probabilistic process	• It is selective • Moves only if there is a direction to follow • It is analytical • Based on the sequence of ideas • Each step must be correct • Uses negation to block bifurcations and lateral deviations • Excludes what does not seem related to the topic • Cates are si lasifications and • Follows the most obvious paths • It is a finite process

Source: Own elaboration with information from De Bono, 1986.

The differences between lateral and vertical thinking are clear, but so is their function. While vertical thinking uses information to reach a solution by applying existing models, lateral thinking uses that information to deconstruct the models and reshape ideas. According to De Bono (1986), both types of thinking complement each other, as while lateral thinking focuses on generating ideas from new ways of seeing things, vertical thinking is useful for evaluating ideas and applying them in practice.

Just as there are individuals with a tendency toward lateral thinking, there are also those who struggle to develop this type of thinking. However, this does not mean that it cannot be enhanced for the first group, nor that the second group cannot be trained. The application of specific techniques promotes the development of thinking that proposes inventive solutions. This suggests that an individual, even without innate qualities for it, can, through systematic techniques, develop this ability until it becomes an attitude of inventive solutions using lateral thinking. The exercises are specific to acquiring the understanding and application of this thinking. Although certain techniques resemble reasoning methods, they differ in their purposes and how they are articulated. Behind the techniques, there is a very concrete goal: to develop lateral thinking as a natural attitude in the individual, so that, once it becomes a disposition in the student, the techniques will no longer be necessary.

Multiple Intelligences in the Classroom

According to Gardner (1983, cited by Armstrong, 2017), the concept of intelligence had been defined in a very limited way. In response, he proposed that intelligence was more than the result of a test, which through a score, established an individual's Intelligence Quotient (IQ), and he suggested an expansion of the concept of intelligence. This expansion defined intelligence as something beyond IQ measurement and should be viewed as the capacity to: "1) solve problems and 2) create products in a rich context and natural environment" (Armstrong, 2017, p. 6). With this new interpretation of intelligence, the mysterious aura surrounding it was dispelled, proposing a functional definition that existed in various forms in people's lives. Given the variety of abilities an individual possesses, Gardner proposed a method that grouped them into eight categories or intelligences. This is how the theory of Multiple Intelligences (MI) originated (Table 2).

Table 2. Summary of the Theory of Multiple Intelligences (1st part)

Developmental Trajectory of Each Intelligence			
Intelligence	Key Components	Symbol System	Ultimate State
Linguistic	Sensitivity to sounds, structure, meanings and functions of words and language.	Phonetic languages (e.g., English).	Writer, speaker (e.g., Virginia Woolf, Martin Luther King Jr.).
Logical-mathematical	Sensitivity to logical or numerical patterns and the ability to discern between them; capacity to maintina long chains of reasoning.	Computer languages (e.g., Basic).	Scientist, mathematician (e.g., Madame Curie, Blaise Pascal).
Spatial	Ability to accurately perceive the visual-spatial world and introduce changes in initial perceptions	Ideographic languages (e.g., Chinese).	Artist, architect (e.g., Frida Kahlo, I. M. Pei).
Bodily-kinesthetic	Ability to control body movements and skillfully manipulate objects.	Sign language, Braille.	Athlete, dancer, sculptor (e.g., Martha Graham, Auguste Rodin).

Musical	Abiltiy to produce and appreciate rhythms, tones and timbres; appreciation of musical expression forms.	Musical notation systems, Morse code.	Composer, perfomer (e.g., Stevie Wonder, Midori).
Interpersonal	Ability to discern and appropriately respond to others´moods, temperaments, motivations, and desires.	Social attitudes (e.g., gestures and facial expressions).	Counselor, political leader (e.g., Carl Rogers, Nelson Mandela).
Intrapersonal	Access to one´s inner life and ability to distinguish emotions; awareness of one´s strengths and weaknesses.	Symbols of the self (e.g., dreams and artistic manifestations).	Psychotherapist, religious leader (e.g., Sigmund Freud, Buddha).
Naturalist	Ability to distinguish members of a species; awareness of the existence of other species with wich we coexist and the capacity to map relationship between different species.	Species classification systems (e.g., Linnaeus); habitat maps.	Naturalist, biologist, animal rights activist (e.g., Charles Darwin, E. O. Wilson, Jane Goodall).

Source: Armstrong, 2017.

According to Gardner (1983, cited in Armstrong, 2017), these intelligences, seen as partially autonomous brain systems, represent a sophisticated version of the "right brain / left brain" learning model from the 1970s.

Intelligences can emerge concretely and at high levels in certain individuals, which explains the existence of geniuses or prodigies with exceptional abilities. These individuals display a superior talent in one of the intelligences, while the others remain at modest levels. This can be explained if we consider that the development of intelligences occurs when they are stimulated—when an individual is exposed to activities that directly impact one of them.

Any activity during early childhood will influence the development of one of the intelligences, which will grow throughout life and decline in old age with the loss of mental abilities. However, the development of the intelligences does not follow the same pattern: some emerge at very early ages, others in adolescence, and some reach their full potential in adulthood.

According to Armstrong (2017), the following points must be kept in mind: 1) We all possess the eight intelligences—some to a greater extent, others to a lesser extent. 2) Most people can develop the intelligences to an adequate level of competence; with proper support and training, anyone can develop all eight intelligences. 3) Intelligences function in a complex way; none works independently or exists in isolation—they interact with each other. 4) There are many ways to be intelligent within each category; every person possesses attributes that make them intelligent in a specific field.

The functioning and ways to cultivate the intelligences are illustrated through a couple of examples from Armstrong (2017): 1) When preparing a meal recipe, "you must read the recipe (linguistic), perhaps divide the quantities in half (logical-mathematical), develop a menu that satisfies all family members (interpersonal), and calm your own appetite (intrapersonal)" (p. 21). 2) When a child plays by kicking a ball, "they need bodily-kinesthetic intelligence (running, kicking the ball, catching it), spatial intelligence (orienting themselves on the field and anticipating the ball's trajectory), linguistic and interpersonal intelligence (properly expressing their point of view if a disagreement arises during the game)" (p. 21). These examples, though drawn from everyday activities, are moments of significant learning—just as when taking a specific class to learn a trade, where an individual exercises their intelligences.

Gardner (2001) considers that a learning encounter is a moment when an individual acquires skills that will be useful for mastering a specific intelligence; however, in that encounter, they also gain skills applicable to other intelligences. The intellectual competencies learned will be useful either through their content or their form. For instance, the knowledge someone gains when learning to play an instrument will be musical. However, the means used to acquire that knowledge could also be applied to other intelligences.

In learning encounters, Gardner (2001) states that several aspects arise that are vital to the development of intelligences: One such aspect is the means used to convey knowledge. In contemporary education, these means are mostly formal and discrete, in the format of symbolic systems: bibliographic, graphic, and technological materials. However, there are also observational learning methods (direct or in vivo), as found in illiterate societies or social groups where knowledge is shared by all. Another aspect is the place where learning occurs. In traditional societies, this happens in the location where the student is found, such that learning takes place where the individual is "doing something"—for example, while working the land. In more complex societies, learning takes place in specialized institutions—schools. Yet these are not the only learning spaces: workshops, studios, laboratories, and learning centers also qualify. Let us remember that, centuries ago, painters recruited apprentices to their workshops, as was the case with Leonardo da Vinci in Verrocchio's studio. Another key aspect is the agents responsi-

ble for conveying knowledge: teachers, who traditionally have included parents, grandparents, or siblings, along with all close relatives or members of the social group.

The three aspects mentioned in learning encounters occur within particular cultural contexts, which influence how knowledge is transmitted.

In modern societies—also called technological societies—knowledge is no longer held by a single individual. Given the vast amount of specialized knowledge developed, institutional figures exist who are specially trained to transmit it. Thus, in order to acquire skills, one must attend one of these centers, where experts are tasked specifically with sharing them.

In this regard, Gardner (2001) suggests that if there is a way to develop more than one intelligence through a single path, "those responsible for planning education must decide which means can be best applied to help the individual achieve the desired competence, skill, or role" (p. 291). The author proposes that individuals should be guided and channeled according to their competencies. For instance, someone with talent should work directly with a recognized master in order to develop a learning relationship that provides them with material for direct investigation (and promotion).

On the other hand, an individual with limited capacities or even an evident pathology may need to develop special prostheses: machines, mechanisms, or other means that can provide information or skills in a way that leverages their intellectual capacities (Gardner, 2001). For individuals who do not fall into either extreme—likely the majority of the population in educational institutions—there are programs and courses available for the development of specific intelligences. This is the case with the model proposed in this study, which aims to foster the development of some of the intelligences that influence the training of creative thinking in first-semester Graphic Design students.

Positive Psychology in the Classroom

Positive psychology emerged in the late 1990s, driven by the research of Martin Seligman at the University of Pennsylvania. This school of thought holds that true happiness is not only attainable but can also be cultivated through the identification and use of an individual's strengths and positive traits, rather than focusing solely on problems and mental disorders. This psychological perspective seeks to promote human flourishing and emotional well-being by studying and enhancing the positive aspects of human experience, replacing the word "failure" with "learning experiences."

Under these principles, creativity is established as a driver of personal growth and social advancement. However, its potential is diminished when it is framed as a characteristic that students either have or lack—

that is, reserved only for some—thus disregarding the possibility of training in creative thinking. This notion limits teachers in implementing didactic strategies that promote this type of thinking and, consequently, affects human flourishing and students' emotional well-being.

Historically, the focus on creative thinking has centered on students' personality traits, perpetuating the belief that creativity is innate and static—that one is born creative and, therefore, does not need training. This perspective overlooks other important factors such as physical and social environments, specific personal skills, emotional support, and cultural diversity, all of which play a crucial role in stimulating or constraining creativity.

Teachers' attention to factors such as inspiring workspaces, interaction with students from diverse backgrounds, and exposure to new teaching models significantly supports the development of creativity. Moreover, it is worth considering the contribution that positive psychology can make in the classroom in terms of emotional well-being, student satisfaction, and enhancement of the learning experience through the application of principles, techniques, and didactics that promote creative thinking (Buzzetti, 2016). Focusing on and committing to fostering these aspects is the full responsibility of teachers, as they are the ones who will be leveraging students' strengths and positive traits to enhance their emotional well-being.

Training in creative thinking allows a shift in perspective, seeing failures as learning experiences and viewing outcomes as enriching experiences that contribute to personal growth and knowledge.

To advance the understanding of how training in this type of thinking contributes to improving emotional well-being—and thus achieving a state of happiness—it is crucial to adopt a holistic approach that recognizes the dynamic interaction between individual traits, social and physical environments, and specific intelligences. This requires moving beyond the dichotomy of "creative" vs. "non-creative" and recognizing the diversity of creative expressions that can emerge in different contexts and situations.

The model proposed here challenges the notion that creativity is static. Through specific didactic strategies, it proposes its development, significantly impacting psychological well-being and happiness, as well as students' strengths and virtues (Table 3).

Table 3. Didactic strategies to strenghthen creativ thinking in the classroom

Fostering optimism	Develong strengths	Encouraging flow	Promoting reslience	Facilitating play and experimentation	Encouraging collaboration and social support
Encouraging an optimistic approach to challenges and problems can help students see oportunities instead of obstacles. This allows them to approach design problems with an open and creative mindset.	Positive psychology fouses on identifying and developing individual strengths. It helps students recognize their unique talents and abilities, which can boost their self-confidence and their ability to generate creative ideas.	The concept of flow is the mental state in wich a person is fully immersed in an activity, losing track of time and self-awareness. Helping students develop projects that sufficiently challenge them keeps them engaged and motivated.	Resilience is the ability to quickly recover from adversity. In design, facing setbacks and criticism is inevitable. Teaching students to see these challenges as learning opportunities fosters a growth mindset.	Positive psychology advocates for play and experimentation as means to foster creativity. Students should feel free to play new ideas without fear of failure.	Creativity often flourishes in collaborative environments. Encouraging the construction of a supportive community where students can share ideas, receive constuctive feedback, and collaborate on creative projects.

Source: Own elaboration, inspired by Delgado, 2022.

Components of the Didactic Model for the Development of Creative Thinking

The proposed didactic model aims to foster the development of creative thinking. Each didactic strategy was designed with the purpose of generating a different perspective on problems through the fields of perception, verbal expression, and graphic expression as drivers of creative thinking.

A. The objectives to be achieved through the application of the model are as follows:

- Exercise and strengthen the right hemisphere
- Awaken dormant sensations
- Develop perception
- Develop intuition, expression, and communication
- Foster creativity

- Promote verbal and graphic communication
- Open up processes
- Help find solutions to problems

B. Through the application of the model, the following skills will be developed as shown in Table 4:

Table 4. Thinking skills developed with the model

Skill	Skill Development
Discriminate	Development of the ability to recognize differences and separate them into parts of different aspects.
Identify details	Development of the ability to distinguish the whole and its parts independently.
Infer	Development of the ability to use obtained information to apply and process it differently.
Analyze	Development of the ability to separate the whole into its parts based on a criterion.
Synthesize	Development of the ability to present an idea in a concrete way. Moving from the quantitative to the qualitative.
Create and find solutions	Development of thinking skills to combine other brain abilities, integrate concepts and propose alternative solutions.

Source: Own elaboration.

C. The application of the model fosters the development of the competencies presented in Figure 2:

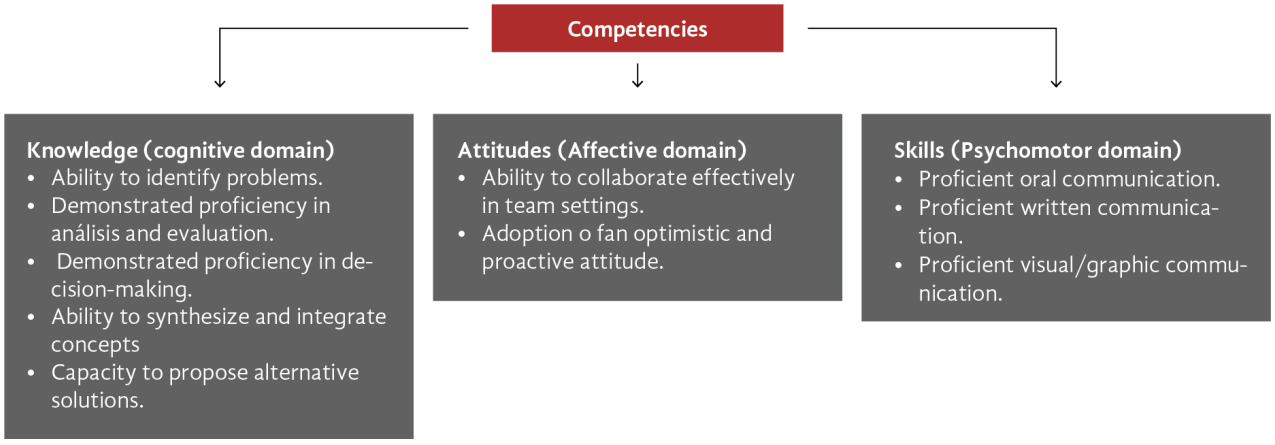

Figure 2. *Competencies to be developed through the model.*
Source: Own elaboration.

D. Para la evaluación de las competencias adquiridas se aplicarán los criterios que pueden verse en la tabla 5:

Table 5. Evaluation criteria of acquired competencies

Criterios de evaluación del aprendizaje		
Conocimientos (Saber)	Habilidades (Saber hacer)	Actitudes (Saber ser)
• Demonstrate the ability to identify problems • Demonstrate the ability to analyze and evaluate • Demonstrate decision-making ability • Demonstrate the ability to combine dissimilar concepts • Demonstrate the ability to propose alternative solutions	• Demonstrate skill in oral expression • Demonstrate skill in written expression • Demonstrate skill in graphic expression	• Show participation in team integration • Show a positive attitude towards problems

Source: Own elaboration, inspired by Delgado, 2022.

Didactics that stimulate creative thinking in Graphic Design students

I. Mental Perception

Sensations are perceived through the senses. Through them, visual, auditory, gustatory, olfactory, and tactile information is received. Mental perception is the way in which the brain interprets the sensations received by the senses, which are organized, selected, and interpreted to generate mental images with which reality is constructed.

From the perspective of lateral thinking, the didactics of mental perception proposed in the model help the student break down structures in order to reorder the parts, which is important because organizing the information leads to a different perception, and this has a decisive influence on how new proposals are created (De Bono, 1986).

From the perspective of MI, the didactics proposed for mental perception in the model impact the student's interpersonal intelligence, as they affect key aspects of the ability to discern and respond appropriately to others' moods, temperaments, motivations, and desires (Gardner, 1983, cited by Armstrong, 2017) (see table 6).

Table 6. Mental perception and didactics

Mental Perception			
Didactic-1	Didactic-2	Didactic-3	Didactic-4
Students visit an Antique shop with the purpose of seeking some inspiration and new ideas. They walk through slowly, in silence, and in a relaxed modo. The exercise can be done focusing on two different keys: • To search for novel ideas without a particular focus. • To find ideas that serve a specific purpose (problema or Project). The student writes down their proposals and presents them to the group.	A poster is shown to the group for 15 minutes. They are asked to describe the message, that is, what the poster communicates. The student develops a graphic proposal in 35 x 50 cm format with color details, images and texts.	The student must use all five senses in the exercise but above all, the mind, to find improvement possibilities for: • A razor • A hair dryer • A refrigerator • A woman´s handbag. The student draws or writes down their proposals and presents them to the group.	The "inverted method" is applied, in which the student looks for unusual ways to deconstruct and escape paradigms and stereotypes. Thus, the student imagines and visualizes situations in reverse: • How to milk a cow • Children playing with a ball • A woman getting dressed The student visualizes and writes how all the situations unfold. The student proposes a creative situation that begins with the end and concludes with the beginning.

Source: Own elaboration inspired by Rodríguez, 1995.

II. Verbal Expression

There is an idea that verbalizing thoughts is the way to make them exist, it is the way to materialize them into people, objects, or situations. In this way, verbal expression allows thoughts to be revealed, enabling the spirit to materialize, as communication is achieved through words, transmitting knowledge, emotions, and experiences.

From the perspective of lateral thinking, the verbal expression didactics proposed in the model impact the student by establishing new categories, as, by not using the already established ones, the thought is freed from the restrictive effect caused by the use of old categories. By establishing new categories, information (ideas) can be handled under labels that do not fit their form but allow new meanings and the development of new ideas (De Bono, 1986).

From the perspective of Multiple Intelligences (MI), the verbal expression didactics proposed in the model impact the student's linguistic intelligence, as they influence key aspects such as sensitivity to sounds, structure, meanings, and the functions of words and language (Gardner, 1983, cited by Armstrong, 2017) (Table 7).

Table 7. Verbal Expression and Didactis

Verbal Expression			
Didactic-1	Didactic-2	Didactic-3	Didactic-4
The student designs business cards for three different professions, using a humorous tone. Only text is used, no images. *The student writes and presents their proposals to the group.*	Names are invented for three products along with their respective brand for each one: • Fine bath soap • Racing bicycle • Soft drink *The student writes and presents their proposals to the group.*	The student writes three newspaper headlines, each consisting of four words, where the words begin with the following letters: 1 - A E I O 2 - A B C D 3 - E I O U *The student writes and presents their proposals to the group.*	The student writes two short stories aimed at promoting ecological awareness: - For 10-year-old children from an elite school - For poor and marginalized adults *The student writes and presents their proposals to the group.*

Source: Own elaboration inspired by Rodríguez, 1995.

III. Graphic Expression

The activity of drawing has an effect on the right hemisphere; it awakens the language of forms, of expression, and the exaltation of the senses. Graphic expression reactivates perceptual abilities and connects them with manual skills, making it possible to communicate complex ideas through graphic representations.

From the perspective of lateral thinking, the graphic expression didactics proposed in the model contribute to the student's graphic illustration fostering the mind to process information toward the stimulation of ideas and alternatives. Likewise, graphic representation allows for the exposition of different levels of interpretation, specifying what is represented, what is happening, what has happened, or what will happen. Graphic expression enables the visualization of various approaches and solutions, granting value to the results, and also stimulating the overcoming of archetypal concepts (De Bono, 1986).

From the perspective of MI, the graphic expression didactics proposed in the model impact the student's spatial intelligence, as they influence key aspects such as the accurate perception of the visuospatial world and the ability to introduce changes to initial perceptions (Gardner, 1983, cited in Armstrong, 2017) (Table 8).

Table 8. Graphic Expression and Didactics

Graphic Expression			
Didactic-1	Didactic-2	Didactic-3	Didactic-4
The student draws on letter-size paper, from memory, the face of someone they know or regularly interact with. It is important to consider that the right hemisphere specializes in recognizing visual stimuli, particularly faces.	The student proposes a new coat of arms as a central symbol to represent our town. They must also design a different coat of arms for the national flag. (The important thing is the new idea, not technical execution.)	The student proposes new designs or improvements for traffic signs; they can also propose new signs that do not yet exist (at least three). The student presents their proposals on letter-size paper to the group, and their functionality is discussed.	The student redesigns an animal, attempting to improve its appearance and functions. The student creates a drawing on letter-size paper, presents it to the group, and explains the improvements. A good representation with detailed improvements is necessary.

Source: Own elaboration inspired by Rodríguez, 1995.

IV. Visualization or Creative Imagination

Creative visualization is the mental ability to envision things before they exist in reality. Visualization employs imagination to conceive the world one longs for. The stimulation of the senses enables the generation of specific mental images related to particular subjects, which becomes a key resource for individuals to project what they wish to achieve: a goal or a change in habit, as it transports them to the deepest part of their being.

From the perspective of lateral thinking, the creative visualization didactics proposed in the model impact students by creating a concrete environment that allows them to free themselves from the inhibitions of logical thinking, which tends to limit ideas due to its judgmental nature. In lateral thinking, the techniques of division (restructuring models) and inversion (viewing a problem from different perspectives) provoke creative restructuring and serve as a starting point for new ideas that stimulate creative visualization (De Bono, 1986).

From the perspective of MI, the creative visualization didactics proposed in the model impact the student's intrapersonal intelligence, as they influence key components such as one's inner life and the ability to distinguish emotions and be aware of one's own strengths and weaknesses (Gardner, 1983, cited in Armstrong, 2017) (Table 9).

Table 9. Creative Visualization or Imagination and Didactics

Creative Visualization or Imagination			
Didactic-1	Didactic-2	Didactic-3	Didactic-4
The student draws their personal mandala, inventing it in a way that helps them relax and meditate. For this, they should try to visualize with their eyes closed. Note: A mandala means circle, as it is a graphic symbol of the universe and its totality, and it consists of geometric lines or other designs. The student uses it to project their perception of reality and themselves within it.	The student visualizes their ideal workspace: the specific place that inspires and stimulates them. They must focus on details such as decorations, ornaments, furniture, instruments, lighting, colors, scents, and textures. The student draws and writes the requested details.	The student thinks of an idea (a design, an object, a project, a plan, a program). It is vital to seek its visibility. They must focus on images that help define the idea. It is also necessary to let fantasy flow and suspend all logical thinking. *The student draws and writes the idea and its details.*	The student visualizes a situation five years into the future. In it, they find an article in a magazine where they are written about. This article explains how they achieved success professionally and became a role model in society. The student visualizes the content of the article, writes

Source: Own elaboration inspired by Rodríguez, 1995.

Conclusions

The various didactic strategies proposed in this theoretical model offer complementary approaches to stimulate creative thinking in first-semester Graphic Design students. Mental perception encourages students to perceive the world in an innovative and unique way, allowing them to find inspiration in their surroundings to develop creative solutions. Verbal expression, meanwhile, provides them with a tool to articulate their ideas clearly and persuasively, facilitating communication and collaboration in the design process. On the other hand, graphic expression enables them to explore and communicate their ideas visually, harnessing the power of visual design to convey messages and emotions effectively. Additionally, creative imagination allows them to explore possibilities and alternative scenarios, fostering experimentation and design innovation. Finally, positive psychology provides a framework for cultivating an optimistic and resilient mindset, enabling them to face challenges with confidence and creativity.

Taken together, these didactic strategies offer a comprehensive approach to nurturing creative thinking in students, equipping them to tackle problems with imagination, originality, and effectiveness.

References

Armstrong, T. (2017). *Inteligencias múltiples en el aula. Guía práctica para educadores*. España: Paidós Educación.

Buzzetti, J.S. (2016). Taller Feliz: Psicología positiva en el diseño de proyectos. *Base Diseño e Innovación, 3*(2), 178-189. Recuperado el 20 de marzo de 2024 de https://diseno.udd.cl/files/2017/03/REVISTA-BASE-N%C2%BA2_investigacion.pdf

Carranza, M. (2021). Pensamiento creativo: un estudio holístico en la educación. Revista Innova Educación, 3(4), 123-132. Recuperado el 20 de marzo de 2024 de https://revistainnovaeducacion.com/index.php/rie/article/view/384

De Bono, E. (1986). *El pensamiento lateral (Manual de creatividad)*. Buenos Aires, Argentina: Paidós.

De Bono, E. (1989). Pensamiento vertical y lateral. En A. Sabag (Comp.), *Creatividad. Antología. Vol. I.* (pp. 149-154). México: Universidad del Valle de México.

Delgado, C. (2022). Estrategias didácticas para fortalecer el pensamiento creativo en el aula. Un estudio meta-analítico. *Revista Innova Educación, 4*(1), 51-64. Recuperado el 20 de marzo de 2024 de https://www.researchgate.net/publication/356325506_Estrategias_didacticas_para_fortalecer_el_pensamiento_creativo_en_el_aula_Un_estudio_meta-analitico

Gardner, H. (2001). *Estructuras de la mente. La teoría de las inteligencias múltiples*. Colombia: FCE.

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (Unesco). (2015). *Declaración de Incheon. Educación 2030: hacia una educación inclusiva, equitativa y de calidad y una educación permanente para todos*. Corea del Sur: Unesco. Recuperado el 20 de marzo de 2024 de https://unesdoc.unesco.org/ark:/48223/pf0000233137_spa

Rodríguez, M. (1995). *Mil ejercicios de creatividad clasificados*. México: McGraw-Hill.

Sabag, A. (1989). *Creatividad. Antología. Vol. I*. México: Universidad del Valle de México.

Souza, D. y Silva, L. (2021). Desarrollo del pensamiento creativo en el ambiente educativo. *Revista Latinoamericana de Estudios Educativos, 17*(1), 164-187. Colombia: Universidad de Caldas.

About the Authors

Adolfo Guzmán Lechuga
PhD in Architecture, Design, and Urbanism from the Universidad Autónoma del Estado de Morelos (UAEM); Master's in Visual Arts, Communication, and Graphic Design from the Academia de San Carlos; and a Bachelor's degree in Graphic Design from the Faculty of Arts and Design at the Universidad Nacional Autónoma de México (FAD-UNAM). He has taught courses in Advertising, Typography, Design Research, and Research and Production Workshop I and II. He has collaborated with the Academic Body of Visual Culture at the Center for Interdisciplinary Studies and Research (CEII) of the Universidad Autónoma de Coahuila in the research line of visual culture. He has also served as chair and committee member for degree examinations at the CEII and as a PRODEP evaluator. He is currently a faculty member in the Design program in Saltillo, Coahuila, with a desirable Prodep profile, and has published in journals such as Mundo Arquitectura Diseño Gráfico y Urbanismo (Sonora), Legado de Arquitectura y Diseño (Estado de México), Tecnología y Diseño (Mexico City), Insignia Visual (Puebla), and Zincografía (Guadalajara). He has been a speaker at ENCUADRE, the International Seminar on Design Research (SID), and the First National Meeting on the Teaching of Visual and Plastic Arts (FAD-UNAM), among others.

María del Socorro Gabriela Valdez Borroel
PhD in Educational Sciences and Master in Research Methodology, both from the Universidad Autónoma de Coahuila, and a Bachelor's degree in Graphic Communication from FAD-UNAM. She has worked as a professor in the Graphic Design, Interior Design, Visual Arts, and Marketing programs at various institutions in Saltillo, Coahuila. She has taught subjects including Theory and Perception of Color, Poster, Packaging and Labeling, Signage, Graphic Composition, Typography, Corporate Identity, Design Research, and Research and Production Workshop I and II. She has served as chair and committee member for degree examinations at the CEII and is a member of the Academic Body of Visual Culture at the CEII within the visual culture research line. She was a member of the Institutional Graduate Program Evaluation Committee and the Communication Academy, both at the Universidad Autónoma de Coahuila. She currently serves on the International Review Committee of the journal Zincografía and works at the Universidad Autónoma de Coahuila as a full-time professor with a desirable Prodep profile. Her publications appear in journals such as Mundo Arquitectura Diseño Gráfico y Urbanismo (Sonora), Legado de Arquitectura y Diseño (Estado de México), Tecnología y Diseño (Mexico City), Insignia Visual (Puebla), and Zincografía (Guadalajara). She has presented at ENCUADRE, the International Seminar on Design Research (SID), and the First National Meeting on the Teaching of Visual and Plastic Arts (FAD-UNAM), among others.

José Ángel Muñiz Flores
PhD in Educational Sciences at the Universidad Autónoma de Coahuila, Master in Digital Art Direction from IEU Campus Puebla, and Bachelor in Graphic Design from the School of Visual Arts at the Universidad Autónoma de Coahuila. He is a professor of Advertising Graphic Design, Legal Aspects of Design, and Ecology. He is currently a member of the Academic Body of Visual Expression, participating in the visual culture research line.