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Creativity with Images: A workshop for Learning and Practicing Ideational Thinking for Visual Thinkers

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ABSTRACT OF PROJECT

The purpose of this project is to communicate the foundations of creativity and some tools of ideational thinking to visual thinkers. The goal of this project is to bring visual thinkers into the science of creativity and demonstrate that they can use ideational thinking tools to improve their visual skills. This project also serves as an attempt to identify the cognitive preferences of visual thinkers to foster their creative skills and to enhance their creative process. The finished product is the content of a workshop comprised by five sections. Each section includes an explanation of the essential topics about creativity and some tools in ideational thinking. The content includes a set of activities to allow participants to experience the information in order to gain a better understanding and retain the information for longer time.

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December 2012

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Buffalo State College
State University of New York
International Center for Studies in Creativity

Creativity with images: A workshop for learning and practicing ideational thinking for visual thinkers.

A Project
in Creative Studies
by
Ana Castelan

Submitted in Partial Fulfillment
of the Requirements
for the Degree of
Master of Science

December 2012

Dates of Approval:

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Aknowledgments

I would like to express my sincere gratitude to the ICSC Faculty for their continuous support of my studies, for thier knowledge and motivation, and for helping me to make my dream of studying creativity comes true. I thank my teachers: Dr. Gerard Puccio and Michael Fox for all their guidance through my learning process and for helping me to enhacen my creativity with your classes, your knowledge, your insightful comments and your advices.

My sincere thanks to my familiy and friends in Mexico who supported and helped me to reach my goal of studying creativity. ¡Muchas Gracias!

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PROJECT PURPOSE

In several academies and universities the curricula of courses related to visual

thinking are focused on teaching techniques and methodologies to learn the visual language

with a complete compilation of theories, principals, applications and history examples.

Higher education institutions have a complete set of courses where student learn how to use

tools and techniques to develop their visual creative outcomes. However, the curricula do not

include courses focused on creative thinking and visual thinking as part of the knowledge

required to be a visual professional. For example, the common curricula in graphic design are

focused on teaching the form of visual representations such as principles of color,

composition, typography, among other similar topics. As Heller (2005) pointed out in his

book, "graphic design education has long been, in large part, concerned with form making.

But it must also embrace conceptual thinking, idea generation, and the communication of

messages" (p. 19).

The work of the visual thinkers is not only based on how they represent or express

data through images or visual material, it is also a work based on the creative process where

visual thinking is used to transform information in visual representations. All the research

and science behind creativity is as important as the knowledge of techniques and

methodologies to work in visual representations. The studies in creativity along with the

scientific research are helpful instruments that can be used to enhance the creative thinking,

to be aware of the cognitive process, and to recognize the way of perceiving the world. In

addition, the science behind creativity allows them to identify their capabilities and abilities

to enhance their ideational thinking, which is one of the most required skills in the industry of

visual work. For these reasons, it is beneficial to share the information explained above using

the common terms, the usual challenges, the regular instrument to work, and with the

cognitive preferences of visual thinkers.

This project is a workshop that creatively transmits the essential topics about the

science in creativity with a set of activities in order to engage the participants not only in the

learning process, but also in the creative process focused on visual thinking. The main

purpose of this session is to bring visual thinkers into the science of creativity and

demonstrate that they can use ideational thinking tools to improve their visual skills. In addition, two more goals are attached to the set of activities that comprise this project, which are: enhancing the ideational thinking and stimulating the visual skills.

The main audience of this project is visual thinkers or people involved in visual processes such as industrial designers, architects, urban designers, interior designers, motion graphic designers, painters, cartoonist, illustrators and graphic designers. In order to include all people whose work has to do with pictures, images, photos, drawings, painting or another kind of visual representations as the audience of this project, the term visual thinkers is used to reference them.

In order to show them the capabilities of their brain as visual thinkers, the framework of Multiple Intelligences theory from Howard Gardner (1983) will be used; specifically, the Spatial-Visual Intelligence. Certain forms of cognition are related to visual reasoning. These spatial-visual forms will be described and explained to show them the type of skills and particular talent they have.

The workshop is divided in six sections. Each section acquires the essential topics about creativity along with activities to experience the knowledge. The order of the topics and the activities were planned to begin explaining the distinction of some cognitive processes of visual thinkers, and to end by showing them how to take advantage and use these distinctions to enhance their creative skills.

SECTIONS OF THE WORKSHOP

The section one is divided in two sections:

1. Introduction of the session:

- Agenda presentation

- Trainer presentation

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- Objectives of the session

2. Multiple Intelligences

- Multiple Intelligences Theory Introduction

- Spatial-Visual Intelligence definition and examples

- Activity: *How we perceive the world around.*

The section two is divided in two sections:

1. Visual Thinking

- Description of the Internal Visual System

- Rules to enhance observation

- Activity called: *How do you look at?*

2. Seeing Creatively

- Filters of visual perception

- Visual Stereotypes

- Activity called: *How visual objects behave?*

The section three is divided in three sections:

1. Divergent Thinking

- How divergent thinking works

- Explanation of the principles of divergent thinking

- Activity: *As many as you can imagine*

2. Convergent Thinking

- How convergent thinking works

- Principles of convergent thinking

- Activity: *Making Visual Decision*

3. Imagery and Creativity

- Explanation about the relationship between Imagery and Creativity

- Why does mental visualization and imagery facilitate problem solving?

- Activity: *Creating Images fron the inner world*

- Activity: *Making Connections from the Inner World*

The section four is an explanation and practice of the following topic:

1. Brainsketching

- History of Brainskecthing

- Principles of Brainsketching

- Methodology of the tool

- Activity: *Generating Visual Ideas*

The section five is an explanation and practice of the following topic:

1. Metaphors and Synectics

- Explanation of the use of metaphors in the creative outcomes.

- Description of the four types of metaphors according to the Synectics Theory

- Activity: *Generating ideas with analogies*

The section six is an explanation of the following topic:

1. Creative blocks: : How visual thinkers experience blocks in their creative process.

- Types of blocks to creativity

- Examples of blocks to creativit according to some visual thinkers.

SECTION I

Introduction

The first part of the session is focused on recognizing and understanding how visual thinkers perceive the world, and how they can use their visual competencies to stretch their visual abilities. In order to demonstrate how they perceive the world, two frameworks,

focused on visual practices in the mind, will be addressed. The first one is the Multiple

Intelligences theory by the developmental psychologist Howard Gardner (1983) where he

addresses the term Intelligence dividing seven different mental processes. This part of the

session will be focused on one of the Intelligences called Visual-Spatial Intelligence. The

second one is based on the Dan Roam (2008) techniques to solve problems using visual

thinking. Dan Roam's techniques that will be addressed are: how to recognize our internal

vision system and how to develop skills to observe carefully.

Objectives

- Demonstrate how visual thinkers perceive the world.

- Demonstrate the different ways of perceiving the world around.

- Demonstrate depth in the internal the visual system.

- Identity the different ways of looking at the world, and how these ways foster the

  creative process in people.

Multiple Intelligences Theory

The developmental psychologist, Howard Gardner, proposed a model of intelligence

where the human intellectual competencies work in harmony separately and as group. For

this perspective, there is not a general or unique ability to define intelligence; this term is

composed by a set of cognitive abilities, talents and mental skills called intelligences

(Gardner, 1983). Gardner pointed out, "Intelligences should be thought of as entities at a

certain level of generality, broader than highly specific computational mechanism like line

directions while narrower than the most general capacities, like analysis. It is in the very

nature of intelligences that each operates according to its own procedures and has its own

biological bases" (Gardner, 1983, p. 72).

Gardner sketched the characteristics and criteria of the intelligences and categorized

them in eight different intelligences as is shown in Figure 1.

Figure 1. Gardner's Eight Intelligences

Intelligences	Description
Linguistic	An ability to analyze information and create products involving oral and written language such as speeches, books, and memos.
Logical-Mathematical	An ability to develop equations and proofs, make calculations, and solve abstract problems.
Spatial-Visual	An ability to recognize and manipulate large-scale and fine-grained spatial images.
Musical	An ability to produce, remember and make meaning of different patterns of sound.
Naturalist	An ability to identify and distinguish among different types of plants, animals, and weather formations that are found in the natural world.
Bodily-Kinesthetic	An ability to use one's own body to create products or solve problems.
Interpersonal	An ability to recognize and understand other people's moods, desires, motivations, and intentions
Intrapersonal	An ability to recognize and understand his or her own moods, desires, motivations, and intentions

Retrieved from Gardner, 1983

The notion of intelligence and its internal structure has been constantly changing throughout the last century. Researchers in the intelligence field have continued updating the basis of Gardner's theory and have followed his set of intelligences as a guide for their work. Gottfredson described intelligence as a mental capacity to reason, plan, solve problems, think abstractly, comprehend ideas, learn quickly, and learn from experience (Gottfredson, 1994). Other authors have defined intelligence as a high level of processing information, such as abstract representations or symbolic encoding (Blazhenkova & Kozhevnikov, 2010).

Spatial Visual Intelligence

In the words of Gardner (1983) "Central to spatial intelligences is the capacities to perceive the visual world accurately, to perform transformational and modifications upon one's initial perceptions, and to be able to re-create aspects of one's visual experience" (p.182). This intelligence has to do with the capabilities to perceive the visual world precisely, to make changes or modifications even without physical stimuli.

According to Carroll (1993), visual spatial ability has to do with the relationship with subcomponents and how individuals deal with materials presented in space. In other words, the main feature in this intelligence is the ability to perceive a form or an object. Arnheim (1960) argues that the most important operations of thinking come directly from our perception of the world, with vision serving as the sensory system excellence that undergirds and constitutes our cognitive process.

This ability is divided in three components: the ability to recognize an object from different angles, the ability to imagine movements among the parts of an object and the ability to think about those spatial relations from the body orientation of the observer (Carroll, 1993).

According to Gardner (1993), the particular facets of this cognitive preference are:

- Orienting oneself in various places.

- Recognition of objects and scenes.

- Utilized when one works with graphical depictions in two-dimensional or three-dimensional versions of the scenes.

- Ease recognition of some other graphics depictions such as symbols, maps, diagrams, or geometrical forms.

- Sensitivity to visual components such as tension, balance and composition.

- The metaphoric ability to discern similarities across diverse domains derives in many instances from a manifestation of spatial intelligence.

In order to demonstrate that this preference does not totally depends upon the visual system; researchers have argued that blind individual can appreciate certain aspects of pictures: "Blind individuals tend to convert spatial experiences into the number of steps (or finger movements) taken in certain direction and into de kind of motion needed" (Gardner, 1983, p.194). There is perceptual system common in tactile and visual modalities, which rely

on mental imagery. This ability has to do more with a set of cognitive experiences than the sense of sight.

The definition of the spatial-visual intelligence has been changed over time. In 1990s cognitive neurosciences demonstrated that higher-level visual areas of the brain are divided in two functional pathways: the object pathway and the spatial relations pathway (Blazhenkova & Kozhevnikov, 2010). The object pathway process visual pictorial information of individual objects in terms of their shape, color, brightness, texture, and size. Also, this pathway processes information about the spatial relations among objects and their parts. From these two differences in pathways of visual areas, studies have identified two types of individuals based on their imagery abilities. Those with high object-imagery ability called object visualizers who are able to use imagery to build high-resolution images of the visual properties such as shape and color; and those individuals with high spatial-imagery ability called spatial visualizers who are able to represent and modify spatial relationships such as location and configuration (Blazhenkova & Kozhevnikov, 2010).

Scientists and inventors often use imagery as part of their problem solving process. For example, the famous scientist Albert Einstein had a strong visual preference, and his fundamental insights were derived not only from mathematical and logical thinking, but also from spatial models. In addition, using drawings on paper, and three-dimensional models scientists developed research and explained the DNA model. Darwin thought of the origin of the species as a branching tree to make an analogy between his internal representations and something from the internal world to explain his theory.

On the other hand, another application of this intelligence can be shown with the ability to anticipate movements. According to Gardner (19, this ability is closely tied to strong imagery. For example, when people play a game of chess, they require visual skills to visualize the movements considering the power of each piece. This game requires physical endurance, powers of concentrations, memory, and imagination (Gardner, 1983).

Activity 1: Section I

In order to engage participants in the learning process of Multiple Intelligences Theory, the activity shown in the Figure 2, should be practiced after the explanation of the content described above. This excercise allows participants to recognize their preferences based on Multiple Intelligences Theory. Also, participants might consolidate the information experiencing their own way of expressing their thoughts using differen resources. Furthermore, this activity allows participants to identify cognitive differences from other people, and their own in order to take advantage of them during their creative process. After working on the activity, participants might reflect on their experiences using analytical skills in order to gain a better understanding and retain information for longer time.

Figure. 2 *How we perceive the world*

How we perceive the world *Multiple Intelligences Activity*	
Materials, Supplies and Equipment	- Sisors - Glue - Photos - Fabric - Yarn - Sheet of papers - Markers - Sticks - Crayons - Dough - Legos
Goal	Demonstrate how we use different intelligences describing a process.

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Objectives: *The participants will be able to….*	• identify their personal preferences in terms of intelligences. • identify the different preferences of their collegees.
Time	25 minutes
Procedure	• Participants will work individually • Participants will answer the following question: What happen when you plant a seed? • Participants will use all the material they want to describe the process. • Point out that participants are free to answer the question in their own way. • Give 15 minutes to participants asnwer the question.
Debrief	Each participant should present its work. Consider having participants debrief using the following question: • What did you notice? • Did you notice the differences between your collegees? • Have you noticed these differences before?

This activity will provide participants with a better understanding of the Multiple Intelligences Theory and how they can identify the different features of each intelligence according to Gardner's Theroy. The metaphorical learning from this activity will bring an opportunity for participants to make a link between the content and the actions need it to complete it. Thus, the information will be reminded easier and transfer it to a real situation. Recognizing the main features of visual-spatial intelligences, participants will be able to understand not only how they perceive the world in order to recognize some individual's differences and take advantage of them in their creative process. Furthermore, debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own life.

SECTION II

Introduction

This part of the session is focused on Visual Thinking. The main purpose of this segment is to demonstrate to participants how the internal vision system works, and show them differen exercise to foster their observing skills. Since we easily gather more visual information of the world and make connections to generate more original ideas, the observing skills are essential for ideational thinking. The objectives of this stage will be approached explaining research and theory of Visual Thinking and showing some examples that demonstrate how this thinking is applied in the everyday life. Then, participants will do some activity to learn how to look at accurately

Objectives

- Demonstrate how the internal vision system works.

- Explain the rules to develop observing skills.

- Show how people usually see the world.

- Demonstrate the visual stereotypes.

- Practice exercise that foster observing skills.

Visual Thinking

Gardner developed his theory of Multiple Intelligences based on different research from different fields. Specifically, Spatial-Visual Intelligence was developed using research from visual thinking among others. In order to understand this intelligence better, it is useful to understand the cognitive processes that occur experiencing this intelligence.

The best way to start thinking visually is to be aware of how our internal vision system looks at the world around. "Every second that our eyes are open millions of visual signals enter as photons of light, and then they are converted into electrical impulses by our

retinas" (Roam, 2008, p. 50). This process takes places a lot of times every second unconsciously. The term visual thinking refers to active looking and taking advantage of the strengths of this automatic looking.

According to Roam, our automatic looking system follows a pattern before we have the chance to think of it. The first stage occurs when we understand where we are; usually our eyes scan the place where we are in order to establish the limits of the space. Then, it splits the parts of the place and creates three-dimensional mental models of which way is up, where the walls are, and where we are located. This pattern has the purpose to establish our orientation and position. Also, our automatic looking process scans signs such as familiar faces, distinctive profiles or movements. "Through unconscious identification and recognition we match what we are looking at with what we expect to see" (Roam, 2008, p. 50). Finally, the system looks for the direction of our movements.

In order to develop good observing skills, Roam developed four rules to live by (Roam, 2008):

- Collect everything we can to look at. The more, the better.

- Have a place where you can lay out everything and really look at it side by side.

- Define a basic coordinate system to give us clear orientation and position.

- Find ways to cut ruthlessly everything and find new angles.

These rules were developed by Roam as a guide to analyze data as part of his problem solving visual method. During this stage of the session these rules will be the guide the activity where the participants will practice gathering visual information from the environment in order to create a visual figure.

Activity 1: Section II

In order to engage participants in the learning process of the explation about visual thinking, the activity shown in the Figure 3, should be practiced after the explanation of the

content described above. This excersice allows participants to break the common way of looking at the world and observe it from different perspectives. Also, participants might consolidate the information experiencing another way of looking at the world in details and with curiosity. The participants will be activale involved in the experience of gathering visual information observing carefully. Futhermore, this activity allows participants to identify their own way to obeserve the external world and how they can gather visual information to use it in the idea generation process. Then, they might reflect on their experiences using analytic skills in order to gain a better understanding and retain information for longer time.

Figure 3. *Looking at from different perspective*

Looking at from different perspective *Visual Thinking*	
Materials, Supplies and Equipment	• Flip charts • Markers • Tape • Crayons • Sheets of paper • Pencils • Frames with patterns
Goal	Practice to look at world in details and with curiosity.
Objectives: *The participants will be able to….*	• look at the world in detail and carefully breaking down the common way of looking at the world. • observe the world from different perspectives
Time	25 minutes
Procedure	1. Participants will work individually. 2. Participants will create a symbol or icon that describe them. 3. Participants will take ideas from outside the room following these instructions: 4. Go outside and choose one space where you feel comfortable.

	5. In 10 minutes, visually analyze the place following the four automatic looking tasks. Take notes about what you are looking at in the orientation, position, identification and direction task.
	6. Look at the same place again, but from different perspectives using frames with patterns, changing your position, paying attention in the details of the objects, the color, textures, shapes, shadows and lights. Take notes, photos, draw, paint or bring a piece of something that you can take from that place.
	7. Participants should bring all their notes, paints, drawings or photos they gathered to the classroom and organize them.
	8. Participants should put up all their visual information in the flip chart to visualize it.
	9. Participant will develop an icon in the piece of paper, using all the visual ideas they gathered and making visual connections to create it.
	10. All participants should present their icons and explain why that symbol describes them.
Debrief	This activity can be quite stimulating and fun for the participants. Consider having participants debrief using the following question: • What was the easy and the difficult part about the excursion out of the room? • Did the action of looking from different perspectives is a challenge for you? • How would your rate the value of this activity to help you in your professional work? • What did you learn? • What was most helpful about this activity?

This activity will provide participants with a better understanding of the visual thinking process. The metaphorical learning from this activity will bring an ooportunity for participants to make a link between the content and the actions need it to complete it. Thus, the information will be reminded easier and transfer it to a real situation. Recognizing the pattern of automatic looking system, participants will be able to break this pattern and foster

their observing skills and take advantage of them in their creative process. Furthermore, The debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own life.

Seeing creatively

Visual thinking has three different kinds of visual practices. The first one is that people see images not things. The second is when we draw, doodle or paint in order to represent what we imagine in our mind. The third visual practices are defined as the way of seeing and thinking actions. In other words, visual thinking occurs when we are seeing, imaging, and drawing (McKim, 1972). People with the habit of seeing the world around from different perspectives at the first glance are highly creative (McKim, 1972).

According to McKim (1972) "Seeing is more than sensing: seeing requires matching an income sensation with visual memory" (p. 43). An important part of what we perceive passes through our senses from outside, and the large part comes from our minds. In order to see creatively, imagination should play the main role during the observation process. With imagination we can use different filters to change the perception of what we are seeing. Instead of seeing something answering the question "what is?", the perceiver will use a degree of imagination to see alternative viewpoints.

Humans actively seek answers to questions even during the vision process. These questions about the world and ourselves are based on our knowledge and frequently affect our perception (Solso, 1994). In order to answer these questions we solve our perception using our expectations to fill the gaps or the reality. As we can see in the Figure 4, the same stimulus can be perceived as an H or an A depending on our perception. We process the letter rapidly and with little attention because we have followed and recognized this pattern a lot of times in our life. The same happened in Figure 5. Some people might perceive the triangles in one direction and others in another direction. Depending on the way we perceive the world and how it is affected by our expectations, we will look at the triangles in different directions.
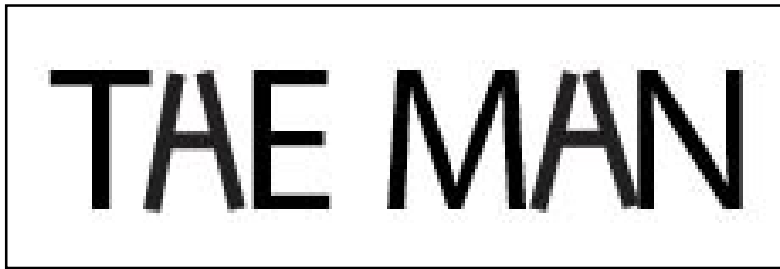
Figure 4. Complete the word

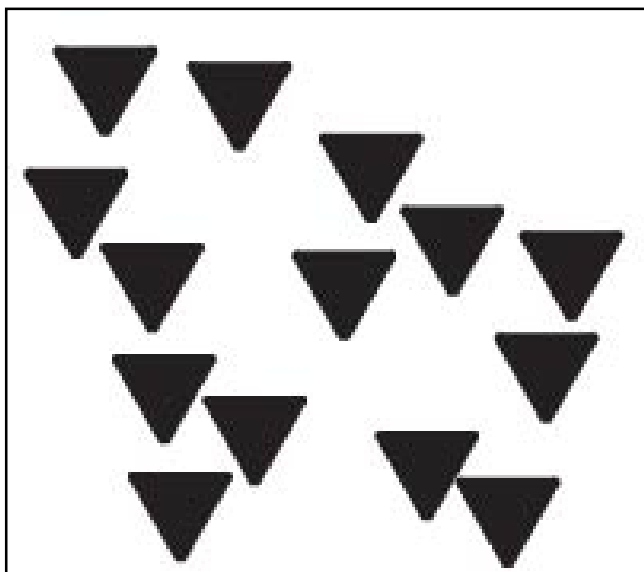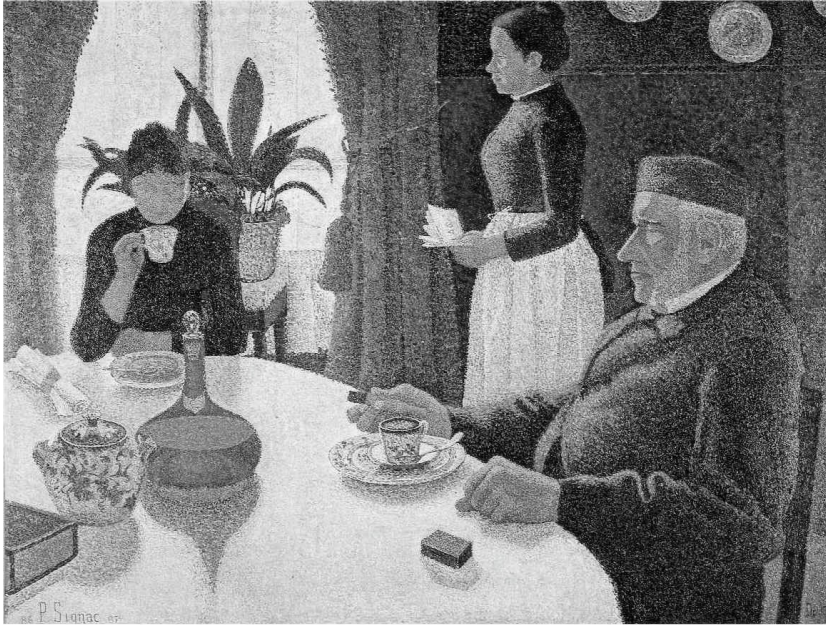

Figure 5. Direction of the triangles

Figure 6. Pointillism

Retrieved from WikiPaintings

"When we process other types of more complex images, we do so in light of their context and the knowledge we have acquired through a lifetime of familiarization with the object" (Solso, 1994, p. 112). Our eye and brain look for the visual field to find some recognizable stable forms, and we relate them to the context of the entire scene and make a connection with our previous knowledge. For example, as we can see in Figure 6, the painting is constrained by dots. We can interpret visual composition composed of different individual signals. In this painting the signals are the dots that together create shapes and forms that can be interpreted by the human mind.

Familiar conceptions are part of our everyday life; even in our viewing process, we follow stereotypes to recognize the world because we are socially conditioned. For this reason, our vision has a tendency to look for what we need and block our perceptions. Stopping this natural tendency of vision requires effort and awareness of our emotions with regard to "unacceptable" images.

According to McKim, to open our mind to new perceptual possibilities of viewing, some actions should play an important role during the viewing process such as, curiosity, fascination, play, exploration, excitement and enthusiasm. Also, it is recommended to change

the perception, abandon object labeling, and look at the environment using to another method of classification. For example, looking at the picture of a fancy hotel room; instead of seeing the furniture as a group, recognize all the things in brilliant colors. Then, identify all the triangular or circular shapes of the pictures or all the patterns with their figures and colors (McKim, 1972).

According to Parini, another way to overcoming stereotypes is analyzing and controlling their graphic representations because observation is conditioned by mental representations. Forcing the mind to use unpredictable connection between graphics articulations, emotions and sensations is a good tactic to avoid automatism in the visual production.

Activity 2: Second II

In order to engage participants in the learning process of seeing the world creatively, the activity shown in the Figure 7, should be practiced after the explanation of the content described above. This exercise allows participants to break down visual stereotypes practicing new visual practices. Also, participants might consolidate the information experiencing a new own way of generating visual representations connecting visual components with different events. Furthermore, this activity allows participants to connect a random thing with a component of design to generate visual ideas and make connections. After working on the activity, participants might reflect on their experiences using analytical skills in order to gain a better understanding and retain information for longer time.

Figure 7. Perceiving Creatively

Perceiving Creatively	
Seeing Creatively	
Materials, Supplies and Equipment	- Markers - Crayons - Sheets of paper - Pencils

	• Color Pencil • Watercolors
Goal	Break down visual stereotypes.
Objectives: *The participants will be able to….*	• experience new visual practices. • generate visual representations connecting visual components with different events.
Time	20 minutes
Procedure	1. Participants will work individually. 2. They should answer two of the following three question: • *How might you show blue and red dancing?* • *What would a fight between yellow and purple look like?* • *What would a lazy line look like?* 3. Participants are free to answer the questions using different materials. 4. Each participant should show and describe their answer.
Debrief	Trainer might conduct a discussion on the value of making connections to produce a creative outcome. Trainer might remaind that a useful practice to break down visual stereotypes is overcoming the fear to connect two unusual and wild things from the external world and to generate a visual representation. Consider having participants debrief using the following question: • What was most challenging? • What might you use from this exercise? • What did you learn? • What was most helpful about this activity?

This activity will provide participants with a better understanding of the visual stereotypes. The metaphorical learning from this activity will bring an opportunity to participants generate visual representations connecting visual components with random things or different events. Thus, the information will be remembered easier and they will

transfer it to a real situation. Recognizing the potential use of breaking down visual stereotypes, participants will be able to understand not only how to break them down, but also how they can connect two random things to create new visual representations. Furthermore, debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own life.

SECTION III

Introduction

In order to enhance creativity, it is essential to understand how the creative process works to recognize its components, and then to comprehend how to manage it and start practicing it to improve the creative skills.

A considerable work of visual thinkers is to face visual challenges in their professional practice. Since this project is focused on ideational thinking, only the two main cognitive processes of creative problem solving are going to be described during the session, which are divergent thinking and convergent thinking. In addition, these two thinking methods are the basis of the tools and techniques that will be explained in the next sections.

On the other hand, in order to frame divergent and convergent thinking for visual thinkers, the mental visualization and imagery will be described as well as the role they play in the creative problem solving process.

Objectives

- Describe divergent and convergent thinking

- Demonstrate the need of the balance between divergent and convergent thinking.

- Explain the principles of divergent and convergent thinking.

- Intruduce mental visualization and imagery as part of the creative problem solving process for visual thinkers.

Divergent Thinking and Convergent Thinking

Since thinking is where creativity takes place, it is fundamental to recognize the types

of thinking that occur in the creative process. The mental action that drives our creativity has

two principal operations: generating and evaluating. In scientific terms these operations are

called divergent and convergent thinking. When people are experiencing the creative process,

at some point the mind moves quickly and looks for many options and alternatives. These

two actions are the particular features of the divergent thinking. On the other hand, the

convergent thinking is used to apply judgments to identify which of the options are the most

relevant. In the Figure 8 Cropley (2006) pointed out some examples of the characteristics of

the two kinds of thinking.

Figure 8. *Examples of Convergent and Divergent Thinking*

Kind of Thinking	Convergent	Divergent
Typical Processes	Being logical	Being unconventional
	Recognizing the familiar	Seeing the known in a new light
	Combining what "belongs" together	Combining the disparate
	Homing in on the single best answer	Producing multiple answers
	Reapplying set techniques	Shifting perspective
	Preserving the already known	Transforming the known
	Achieving accuracy and correctness	Seeing new possibilities
	Playing it safe	Taking risks
	Sticking to a narrow range of obviously relevant information	Retrieving a broad range of existing knowledge
	Making associations from adjacent fields only	Associating ideas from remote fields
Typical Results for the Individual	Greater familiarity with what already exists	Alternative or multiple solutions
	Better grasp of the facts	Deviation from the usual
	A quick, "correct" answer	A surprising answer
	Development of a high level of skill	New lines of attack or ways of doing things
	Closure on an issue	Exciting or risky possibilities
	A feeling of security and safety	A feeling of uncertainty or excitement

Retreived from Cropley, 2006, p. 392

It is necessary to reach a dynamic balance between convergent and divergent

thinking during the creative process. "Divergent and convergent thinking are two natural

mental process that people use in everyday life, particularly when approaching a task has

significances, and for which there is a clear desire for the best possible outcomes." (Puccio,

Mance, Switalsky & Reali, 2012, p. 46). For example, when people are shopping for

something specific, first they look for different options and alternatives before to making a decision. Then, they use their criteria to select items based on price, color, brand and so on. People usually tend to overlap these two types of thinking. They introduce judgment at the same time that they are looking for options. As we have learned to use these mental actions at the same time since we were children, it is necessary to be aware of the way we use these two types of thinking and find the essential balance.

Divergent Thinking and Principles

Divergent thinking has been recognized since the psychologist J.P.Guilford's work. This process is defined as the ability to produce a diversity of responses to an open-ended problem (Runco, 1991). Divergent thinking has been used for many years as a measure of creative potential. The American psychologist Ellis Paul Torrance suggested that fluency, flexibility and originality should be criteria to interpret the divergent thinking potential of an individual. He stated that the interaction of these aspects is strongly related to the creative performance (as cited in Runco, 1991). The aim of divergent thinking during the creative process is to generate many different ideas about a specific topic. When we are engaged with this process, our mind stretches to explore all possible options beyond the familiar and known without making a judgment (Puccio, Mance, Switalsky & Reali, 2012).

In order to successfully apply divergent and convergent thinking in the creative process, it is essential to follow a set of principles that help people to improve their abilities to utilize these thinking processes. "For individuals, these principles have the power to change thinking and, thus, behavior. Once internalized these same principles help to transform an individual into an active thinker," Puccio (2011) claimed.

The first rule in divergent thinking is *Defer Judgment*. This rule mainly suggests holding the evaluation of the ideas until a later time. Suspending the judicial faculties allows mind to be able to successfully generate novel alternatives. According to Puccio et al.,

(2012), the benefits of using this rule are: making people more receptive and open to new possibilities and helping get a new way of looking at things rather than looking at more of the same.

The second rule is "Go for quantity." This rule is based on the fact that quantity supports quality. The more ideas a mind can generate, the more creative outcomes are likely to come up. Research suggests that the most original ideas come after a long period of extended idea generation (Puccio et al., 2011).

The third rule is "Make Connections." The human mind is able to make associations from one input and create a new one. "This principle is great friend to novelty because if you don't get something unusual from your initial fluency, then you have yet another chance to create it by piggy backing off other ideas or comments." (Puccio, et al., 2011 p. 91) The benefits of this principle are: encouraging flexible thinking and providing cross-fertilization of results.

The last rule is called "Seek Novelty," which encourages your mind to stretch your thinking. This rule looks for originality in divergent thinking in order to conceive outcomes that have never been considered. According to Puccio, et al. (2011) some of the benefits of this rule are: leading to breakthrough ideas and stimulating ideas that may be practical.

Activity 1: Section III

In order to engage participants in the learning process of divergent thinking for generation of visual representation, the activity shown in the Figure 9, should be practiced after the explanation of the content described above. This exercise allows participants to practice divergent thinking to generate visual ideas. Also, participants might consolidate the information experiencing in their own way of separating divergent thinking from covergent thinking focus their thinking on generating ideas. Furthermore, this activity allows participants to follow the divergent thinking rules to generate visual ideas and make

connections. After working on the activity, participants might reflect on their experiences

using analytical skills in order to gain a better understanding and retain information for

longer time.

Figure 9. *As many as you can*

	As many as you can
	Divergent Thinking
Materials, Supplies and Equipment	• Four figures in a sheet of paper (circule, triangle, square) • Crayons • Half of a sheet of paper • Markers • Color Pencil • Flip Chart
Goal	Practice visual divergent thinking.
Objectives: *The participants will be able to….*	• Practice divergent thinking. • Apply the divergent thinking principles to generate visual representations.
Time	15 minutes
Procedure	1. Participants will work in groups of two or three people. 2. Participants should create **as many characters as they can** using a triangle, a circle, an square shape and a straight line. 3. The shapes and the straight line can have different sizes and colors. 4. The character should be respresented visually in each half sheet of paper. 5. Drawing is allowed on the piece of paper to develop the characters. 6. Each character finished should be put up on the flip chart. 7. The generation of the characters should follow the prinicipals of divergent thinking

Debrief	This activity should be full of energy and playfulness, and the trainer might point out characteristics of the environment that was created for the participants working on divergent thinking.
	Participants should explain their characters.
	Trainer might remaind the principles that were applied to come up with the characters.
	Consider having participants debrief using the following question:
	• What did you notice?
	• What rule was the most difficult to apply?
	• What changed in your visual process when your objective was "go for quantity"?
	• What was most helpful about this activity?

This activity will provide participants with a better understanding of the use of divergent thinking in the creative process and how this cognitive process can be practiced following its rules for visual idea generation. The metaphorical learning from this activity will bring an opportunity to participants to make a link between the content and the tasks to complete it. Thus, the information will be remembered easier and they will transfer it to a real situation. Recognizing the potential use of following the rules of divergent thinking, participants will be able to understand not only how to use this mental process, but also how they can generate novel and original visual representations. Furthermore, debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own life.

Convergent thinking and Principles

Convergent thinking attempts to consider all the information in order to arrive to the single correct or best answer. This process requires speed, accuracy and logic to obtain the most logical answer. In addition, convergent thinking emphasizes speed, accuracy, logic and the

recognition of the familiar information. Therefore, this process is more useful in circumstances where a ready-made answer exists and needs simply to be recalled from stored information by applying recognition and make decision strategies (Cropley, 2006).

According to Puccio et al., (2011), the principals of convergent thinking, not only help to successfully evaluate ideas; also, they can be used as a guideline for team decision-making.

The first principle of convergent thinking is called "Apply Affirmative Judgment." This rule encourages the evaluation process with a constructive attitude. Looking at the positive aspects help to consider carefully different perspectives of something new. Since people have been trained to be critical since they were children, their thinking often is oriented toward find different reasons why an idea it won't work (Puccio et al., 2012).

The second principle is "Keep Novelty Alive." This principle looks for protecting and maintaining the novelty that occurs during the divergent thinking. Puccio et al. (2011) pointed out, "keep novelty alive principal helps us to avoid simply discarding unexpected outcomes as mistakes but to be open to benefits associated with new discoveries" (p. 100). Keeping this principle present helps people to be open to new and unexpected outcomes.

The third rule is called "Check your Objectives." This principle has the purpose of encouraging people to be aware of the situation considering all its aspects (Puccio et al., 2012). During this process people should be focused on what is realistic. Also, this principle helps people to evaluate an idea that can be original, but at the same time useful to meet a need. In addition, during the convergent thinking it is necessary to consider if the needs of the challenge or problem are being addressed. (Puccio, Mance & Murdock, 2011)

The last principle is "Stay Focused." This principle is a reminder that the convergent thinking is a reflective process. According to Puccio et al. (2011), "to invest the necessary thought and energy to ensure that the best alternatives are being selected and the developed"

(p. 102). This rule helps to analyze the topic and to recognize its components in order to gain insight.

Activity 2: Section III

In order to engage participants in the learning process of converget thinking, the activity shown in the Figure 10, should be practiced after the explanation of the content described above. This exercise allows participants to practice the evaluation process to select visual ideas after the divergent thinking process. Also, participants might consolidate the information practicing their evaluative thinking using cirteria as guideline. Furthermore, this activity allows participants to follow the convergent thinking principles to evaluate a visual ideas. After working on the activity, participants might reflect on their experiences using analytical skills in order to gain a better understanding and retain information for longer time.

Figure 10. *How do you look at?*

How do you look at?		
Convergent thinking		
Materials, Supplies and Equipment	• Dots • Sheets of paper • Pencils • Flip Charts	
Goal	Practice convergent thinking for visual work.	
Objectives: *The participants will be able to….*	• practice convergent thinking applying its principles. • Experience the Hits tool to evaluate a different options. • practice evaluative thinking using criteria as a guideline.	
Time	30 minutes	

Procedure	1. Participants will work with the same group of people they worked in the previous activity (divergent thinking).
	2. Participants will choose the better characters they created in the divergent thinking activity that fit in the next challenge:
	i. You were hired to design the main character of a new chocolate-milk brand. The client gave you some information about the main target of the product.
	ii. The target will be kids from 8 to 9 years old. The social and emotional growth features of these children are:
	iii. "Eight-year-olds enjoy sharing their viewpoints on a variety of topics. They have a clearly-developed sense of self-worth and may express frustration in response to activities that they perceive as areas of personal weakness. Eight-year-olds begin to understand the concept of masking emotions and can vary their use of coping strategies to deal with challenging situations. In peer interactions, they may start to engage in leadership, goal-setting, elaborate fantasy play and an assortment of interactive games. Eight-year-olds still rely on adults for a sense of security, but are proud of their independence and will want to express it. Under emotionally-stressful circumstances, they will seek adults in less direct ways but still need contact." ("PBS Parents", 2003)
	3. Following the previous information as criteria, participants will choose those 3 characters that fit better for the new product practicing the Hits Tool.
	4. Before reading the target's product information, each

	participant will use 4 dots to select the characters that fit best according to the audience and product. 5. Participants will gather those with the most quantity of dots. 6. On a flip chart they will put up the three characters they chose Next to each character they will write down a brief explanation their decision.
Debrief	Consider having participants debrief using the following question: • What did you learn? • What was most helpful about this activity?

This activity will provide participants with a better understanding of the use of convergent thinking to evaluate visual representations and how this thinking works as an essential part of the creative process. The metaphorical learning from this activity will bring an opportunity to participants to make a link between the content and the tasks to complete it. Thus, the information will be remembered easier and they will transfer it to a real situation. Recognizing the potential use of convergent thinking, participants will be able to understand not only how to use this mental process, but also how following its rules allows them to make an effective evaluation of visual ideas. Furthermore, debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own life.

Mental Visualization and Imagery

Reasoning plays the main role in the problem solving process. The use of mental images, as part of the reasoning process, provides schematic images with essential elements of a situation allowing such elements to be processed easily and rapidly. Moreover, images allow representations of objects and events where it is possible to anticipate mental changes of the external world (Logie & Denis, 1991). In fact, imagery can be regarded as a mental

code with properties that are essential to the generation of conclusions beyond the initial information (Logie & Denis, 1991).

The initial stage of problem solving not only depends on the identification of its elements, but also on changes in its internal organization. Visual imagery facilitates these changes because it permits free transformation of the problem structure. Logie & Denis (1991) stated that mental images are a set of actions that allow subjects to avoid the logical thinking from the verbal formulation of the problem. Also, mental images are flexible representations that permit the manipulation of problem in an uncommon way.

Imagery provides benefits in the process of problem solving: "The ideas that imagery's richness may deliver interrelationships less apparent in language and that the nature of images makes them particularly amenable to integration and manipulation" (Roskos-Ewoldsen, Intons-Peterson & Anderson, 1993, p. 9). Imagery is more likely to engage affective and motivational systems than verbal productions.

Activity 3: Section III

In order to engage participants in the learning process of using imagery for generation of visual representation, the activity shown in the Figure 11, should be practiced after the explanation of the content described above. This exercise allows participants to practice use their inner world to generate visual ideas. Also, participants might consolidate the information experiencing in their own way of bringing visual figures from their unconscious mind. Furthermore, this activity allows participants to use another resource to generate visual ideas and make connections. After working on the activity, participants might reflect on their experiences using analytical skills in order to gain a better understanding and retain information for longer time.

Figure 11. Creating images from the inner world

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Creating images from the inner world *Imagery*	
Materials, Supplies and Equipment	• Sheets of paper (two or three per person) • Ambient music
Goal	Using mental imaginary to visualize figures.
Objectives: *The participants will be able to….*	• Use mental imaginary to develop visual representations. • Practice mental imagery to create new images from the inner world.
Time	15 minutes
Procedure	1. Participants will work individually. 2. Participants should close their eyes while the trainer says the following instructions: - Take a deep breath. - Focus your mind on your breath. - Feel the sensations in each part of your body. - Imagine a half of a shape (any shape). - Make it five times larger. - Give a half of what you have now to another shape. - Look what you have left. - Open your eyes. 3. When participants have finished visualizing the instructions, they will draw or write down in a sheet of paper the *first* half, then the five times larger bit to represent visually or written what they have developed.

Debrief	Trainers might use "ambient" music while participants are working on the mental imagery process.
	Participants will describe their visual or written representations.
	Consider having participants debrief using the following questions:
	• What was most challenging?
	• What did you notice?
	• Did you picture the objects in your mind?
	• Did you find it easy or difficult to imagine the objects in details?
	• What was most helpful about this activity?

This activity will provide participants with a better understanding of the use of their inner world to create visual representations and how this cognitive process can be used for visual idea generation. The metaphorical learning from this activity will bring an opportunity to participants to make a link between the content and the tasks to complete it. Thus, the information will be remembered easier and they will transfer it to a real situation. Recognizing the potential use of imagery in the creative process, participants will be able to understand not only how to use this mental process, but also how they can use with their unconscious mind to create visual representations. Furthermore, debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own life.

Activity 4: Section Three

In order to engage participants in the learning process of using imagery for making connections between visual representations, the activity shown in the Figure 12, should be practiced after the explanation of the content in this section. This exercise allows participants to practice using their inner world to generate visual ideas and make connections to create a new visual figure. Also, participants might consolidate the information, experiencing in their own way, using their memory and imagination to create visual figures from their unconscious

mind. Furthermore, this activity allows participants to use another resource to generate visual

ideas and make connections. After working on the activity, participants might reflect on their

experiences using analytic skills in order to gain a better understanding and retain

information for longer time.

Figure 12. *Making Connections in the Inner World*

Making Connections in the Inner World *Imagery*	
Materials, Supplies and Equipment	• Sheets of paper (two or three per person) • Ambient music
Goal	Making connection using visual imagery.
Objectives: *The participants will be able to….*	• Practice divergent thinking using visual imagery. • Use visual imagery to bring visual information and make connections. • Apply visualizing figures and objects from the unconscious mind.
Time	15 minutes
Procedure	1. Participants will work individually. 2. Participants should close their eyes while the trainer is saying the following instructions: - Close your eyes. - Take a deep breath. - Focus your mind in your breath. - Feel the sensations in each part of your body. - Take a minute to imagine your favorite book. - Picture it vividly as you can- everything what you can see from your favorite book cover. The colors, the font title, the figures and the patters in it. - If you don't remember the cover of your favorite book, imagine another one that you have found interesting. - Now, think of a gum package. Picture in your mind the colors of

	the package. Also, the colors and the forms of the brand's title in the package, the background's pattern and all visual details. - Take one or two visual features of the gum's package and add it to the cover of the book you chose. - Find a place in the cover of the book for your new visual elements. - Rearrange all the elements with aesthetics. - Take your time to do it. - Look at what you have left. - Open your eyes when you had finished. 3. When participants have finished, the will draw or write down on a sheet of paper what the book's cover looks like after adding the elements from the package of gum.
Debrief	Trainers might use "ambient" music while participants are the mental imagery process. Trainer might say the instructions slowly. Participants describe their visual or written ideas. Consider having participants debrief using the following question: • What was most challenging? • What did you notice? • Did you picture the objects in your mind? • Did you find easy or difficult to imagine the objects in details? • What was most helpful about this activity?

This activity will provide to participants a better understanding of the use of their inner world to create visual representations and how they make connections to generate visual ideas. The metaphorical learning from this activity will bring an opportunity to participants to make a link between the content and the tasks to complete it. Thus, the information will be remembered more easily and they will transfer it to a real situation. Recognizing the potential use of imagery in the creative process, participants will be able to understand how to use this mental process, and to understand how to make connections using

memory to bring back some objects that can be used as inputs to create new visual figures. Furthermore, debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own lives.

SECTION IV

Introduction

This section is focused on the Brainsketching tool, which is a creative and useful method oriented for visual thinkers based on ideational thinking. The section reviews the background of the tool and it's similarities with other tools for generation of ideas. The role that sketches and drawings play in the representations of ideas will be described as well. Furthermore, the methodology of the tool will be reviewed step by step to finally experience the tool with an activity.

This tool might be the best methodology for specific types of visual challenges. This method is commonly used in fields where the visual thinking plays the main role. It is recommended to use this method for tangible problems, such as ways to improve the design of a product. However, this tool also works for intangible or abstract problems, but the sketches can be used to symbolically represent direct aspects of the problem (VanGundy, 1988).

Objectives

- Describe the principles of the Brainsketching tool.

- Demonstrate the used of visual ideas in Ideational Thinking.

- Explain the methodology of the tool step by step.

- Practice the Brainsketching tool.

Brainsketching

Brainsketching is an idea generation technique based on sketching. This version of brainstorming is based on doodling or drawing, which are elements that stimulate divergent thinking, and it follows the same rules and methodology of the Brainwriting tool. During the Brainsketching process, participants draw their ideas individually. Then they switch their idea and at the same time obtain a new one. Finally, they generate another idea building on a previous idea from another person and so on. Because of its methodology, Brainsketching is a useful tool to build on another idea or get connection from other concepts that are previously generated.

This tool can be applied for creative problem solving process during the step called Exploring Ideas. This step is related to ideational thinking skill, which is the ability to produce original mental images and thoughts that respond to important challenges (Puccio et al., 2011). When the challenge is defined, the next step is to find useful solutions. Here is where the ideational thinking takes place. The main characteristic of this skill is to take ideas from different domains and combine them successfully in a new way. In addition, the main cognitive process of this skill is idea generation by divergent thinking.

According to VanGundy (1988), Brainsketching was design by Pickens in 1980 as a variation of the Pin Cards technique. The main feature of this tool is the dynamic of passing drawings around the group members with sketches as graphical representation of ideas instead of written notes. This version is more abstract, symbolic, and with more details than the ideas used in the Brainwriting tool.

Two mental processes are used in this tool, which are sketching and idea generation. Sketching is the oldest and most useful activity of visual thinkers. Commonly, when visual thinkers work on in a visual project, they start their creative process drawing a variety of vague or half-formed ideas called sketching. This system of graphic representations has the

purpose of clarifying existing ideas and developing the new ones (Fish & Scrivener, 1990).

Also, sketching allows different ways of graphic representations of an idea that is not

complete and can be interpreted it in different ways. This ambiguity enables one to re-

interpret what visual thinkers have just drawn, and to proceed designing with a newly insight.

Van der Lugt (2005) stated, "The interaction that designers have with their sketches is seen as

essential to creativity in design activity" (p. 102).

During the idea generation process, sketches can stimulate creativity thinking,

specifically during the individual generation process, by providing new direction to generate

yet another idea with the collaboration of each participant. Sketches can provide an integrated

group process when they are working on developing their ideas from a previous one. In

addition, the reflective conversation that might come up in last part of the Brainsketching

might make substantial connections within group member and enhance the group process

(VanGundy, 1988).

Brainsketching allows people to freely prepare their ideas before sharing them and to

reduce production blocks. Furthermore, this method fosters the design group idea generation

process by providing collective graphic memory for the group members, by allowing the

group member to be involved in a conversation with each other's drawings, and by

stimulating building on each other's ideas. In addition, this tool minimizes interpersonal

conflict, status difference and effects of a dominating group member (VanGundy, 1988).

In order to asses how effective this methodology is for the idea generation process,

Van der Lugt (2005) studied this activity using Linkography, which is a tool that addresses

the ways in which designers build on others' inputs. According to Van der Lugt "Results

show that applying brainstorming tool, participants generated significantly ideas. However,

using Brainsketching tool, participants generated significantly more connections with early

ideas. Also, using Brainsketching tool, participants made more incremental connections while

maintaining a similar level of "wild leap" connections." (Van der Lug, 2002, p. 43)

Methodology:

The procedure of this tool described by VanGundy (2005), is the following:

1) The group discusses the problem for purpose of clarification.

   • Not solution should be suggested.

2) Tell each group member to draw a sketch of the problem solution.

   • Not talking is permitted during this activity.

   • Mention that the sketch does not need to exemplify exactly the solution; it may be
     something abstract or symbolic.

   • In this methodology is not necessary to have artistic abilities.

   • It is more important what people draw than how people draw.

   • During this step people should draw without collaboration of others members.

3) Let people draw about 5 minutes.

4) Tell group member to pass their sketches to the person on their right.

5) Tell group member receiving the sketch to review it, improve it or come up with a new
   idea.

   • The ways to improving the sketch could be by adding more elements to the
     sketch, making some comments or drawing a new sketch.

6) Let people draw about 5 minutes.

7) Tell group members to pass this drawing again to the person on the right.

8) Repeat steps 3 and 6 until time is called.

   • It is recommended to work about 20 minutes on these steps of the tool and make 5
     rounds of idea sketching

9) Collect all the sketches and review them with a reflective discussion.

   • Place each sketch on a flip chart.

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10) Examine each sketch and use it to brainstorming ideas.

11) Record new ideas stimulated by the sketches using sticky notes and place them on a flip

chart.

Material, supplies and participants:

- It is recommended to work on this tool with a group of 4-8 people.

- Consider sit each member with enough space between each participant.

- It is recommended to use art material such as markers, drawing pencils, crayons, and

colors pen.

- Sticky-notes, flip charts and sheet of paper with different sizes and colors.

Activity 1: Section IV

In order to engage participants in the learning process of the Brainsketching tool, the

activity shown in the Figure 13 should be practiced after the explanation of the content

described above. This exercise allows participants to practice the Brainsketching tool in order

to generate visual ideas. Participants might consolidate the information experiencing in their

own way the collaboration of visual ideas to develop original and novel outcomes.

Furthermore, this activity allows participants to make connections and build on the ideas of

others. After working on the activity, participants might reflect on their experiences using

analytic skills in order to gain a better understanding and retain information for longer time.

Figure 13. *Generating Visual Ideas*

Generating Visual Ideas	
Brainsketching	
Materials, Supplies and Equipment	• Markers • Pens • Crayons • Color Pencils

	• Idea Handout
	• Tape
	• Flip Charts
Goal	Practice Brainsketching tool
Objectives: *The participants will be able to….*	• understand the methodology of the Brainsketching tool. • practice the collaborative visual idea generation. • practice divergent thinking based on visual representation.
Time	30 minutes
Procedure	1. The group should be divided in two groups. 2. Distribute the Idea Handout to each participant. 3. Trainer should review the divergent thinking rules and the convergent thinking rules as well. 4. Each member should draw something abstract or symbolic to answer the question (It is not necessary to have artistic abilities). 5. Participants have 5 minutes to draw. 6. Tell the group member to pass their Idea Handout to the person on their right. 7. Tell group members receive the sketch. They should review it, and then improve it or come up with a new idea. 8. After 5 minutes, tell group to pass the Idea Handout to the person right next to you. 9. Repeat the steps 5, 6 and 7 until time is called. (It is recommended to make 5 rounds of idea sketching). 10. Tape up all the Idea Handout in the flip charts. 11. Following the criteria mentioned in the Idea Handout, participants will select with dots the better sketches according to the criteria of the Idea Handout. 12. Review the sketches with more dots from the two groups with a reflective discussion.

Debrief	This exercise can be used as a warm-up to get everyone involved before the brainstorming session. Consider having participants debrief using the following question: • What was most helpful about this activity? • What can we apply? • What did you learn? • What was the most challenging? • What part of the activity was the most fun?

This activity will provide to participants better understanding of the Brainsketching tool and how they can use it for generating visual ideas. The metaphorical learning from this activity will bring an opportunity to participants to make a link between the content and the tasks to complete it. Thus, the information will be more easily remembered and they will transfer it to a real situation. Recognizing the potential use of the Brainsketching tool in the creative process participants will be able to understand not only how to apply the tool, but also how the divergent and convergent thinking works in this methodology. Furthermore, debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own lives.

SECTION V

Introduction

This section is focused on describing the role of metaphors in the creative thinking and the creative problem-solving process called Synectics. Metaphorical thinking is an important process to apply in many design methods and processes. Specifically, visual metaphors are potent sources of creative ideas for a variety of professions in the visual field. The practice of these devices will provide participants a means and a way to communicate visual ideas in a meaningful manner. Furthermore, they will provide a deep sense of connection with the information to make complex visual representations.

This section includes a brief description of the different types of metaphors from the Synectics model. This process, based on the use of metaphors, provides a freethinking state of consciousness that mobilizes both sides of the brain to transform the "familiar" into the strange and then back to the familiar again.

Objectives

- Demonstrate the important role of visual metaphors in the creative outcomes.

- Describe the different metaphors based on the Synectics model.

Metaphors and Synectics

Metaphors are essential to creative thinking. They allow people to transform familiar things into unfamiliar ways, and unfamiliar things into familiar ways (Kelley-Lainé, 2003). A variety of approaches have defined the meaning of metaphor. According to Aristotle, a metaphor doesn't just refer to the meaning of something, but also represents some aspects of it (Saffer, 2005). People have used metaphors for centuries through their language to use different resources come up with new meanings such as images, word or sounds.

Metaphor uses language as thoughts to meaning through the use of linguistic and visual symbols. It is through these symbols that people convey and understand meanings. According to Feinstein (1985), symbols can be interpreted in two ways: literally and metaphorically. Literal symbols are representations where people understand one thing in terms on another thing while metaphoric symbols are representations that people understand one thing in terms of another of a different kind. If these representations are visual symbols, the same principles apply. For example a painting with colors and shapes not only can portrait something from the reality, but also can be a metaphor of some feelings or thoughts from the author. In the metaphorical process feeling, thoughts, situations or ideas are

connected in a new order. These new associations bring new insights and different or deeper levels of meaning.

The power of the metaphorical thinking is shown in different creative outcomes through the history. Studies have shown that new ideas are due to the combination of ideas. If all the creative outcomes come from the juxtapositions of two random objects or ideas, the metaphor is an essential cognitive process of creative thinking. These associations of two different objects can be represented by different symbols. In the case of visual metaphor, the juxtapositions are represented by visual figures. The process takes place when the brain converts verbal information into images, and then saves it in visual information.

Visual or pictorial metaphors are used often in advertising or films. This type of thinking is a good technique of generation of ideas in disciplines based on visual thinking, such as graphic design, architects and illustrators. Visual metaphors spring from the elasticity of the mind contributing to the construction of different meanings, clarification and expansion the reality (Feinstein, 1985).

Synectics is an approach to creative problem solving based on analogies and metaphors to analyze a problem and develop possible solutions. This method was developed by William Gordon, in 1944, who later was joined by George Prince. The word *synectics* comes from Greek word *syn*, meaning "to bring together" and *ectikos*, meaning "diversity".

Synectics is intended to induce appropriate psychological states to enhance individual's creative thinking. This process involves two main aspects: making the familiar strange and making the strange familiar again.

Making the familiar strange: This term has the purpose of distorting, transposing, changing and inverting the common ways of looking. It attempts to achieve a new perspetive at the same old world, people, ideas, feelings and things. This essential active in the creative

thinking involves several different methods of achieving a different look at some aspects of the known world (Gordon, 1961).

Making the strange familiar: The humans are conservative organisms. When a human face something strange, the mind attempts to force the strangeness into an acceptable pattern or change it to make room for it. According to Gordon (1961), "The mind compares the given strangeness with data previously known and in terms of these data converts the strangeness into familiarity" (p. 34). This new perspective transforms the potentials into a variety of new solution.

Synectics has four mechanisms to make the familiar strange in metaphorical terms, which are personal analogy, direct analogy, symbolic analogy and fantasy analogy.

Personal analogy: An individual must imagine one's self trying to become an object, person, thing or idea. "Personal identification with the elements of a problem releases the individual from viewing the problem in terms of its previously analyzed elements. For example, if the problem is to design a better door hinge, a direct analogy might be: what does a hinge "feel" as it is being moved back and forth? The person should think himself to be a door hinge in constant movement in order to think of what it feels. This application demands extensive loss of self. In the words of VanGundy (1988), "The greatest degree of personal submersion into the object, the more effective analogy is likely to be in producing the desire psychological state" (p. 185).

Direct Analogy: These analogies attempt to describe a clear relationship between the problem and some objects or ideas. For example, following the example of the door hinge, it can be linked to a similar feature of the clamshell. Any source that can offer a direct relationship between the problem and the object can be used (VanGundy, 1988). Diversity of backgrounds and fields offers richness to the direct analogy.
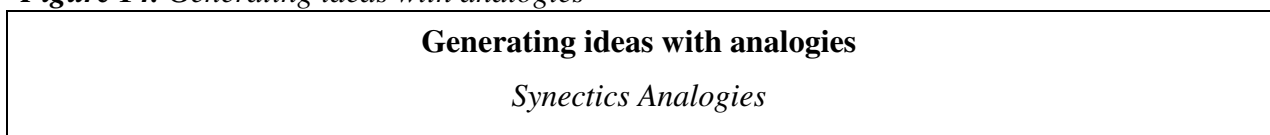
Symbolic Analogy: This type of analogy uses objective and impersonal images to describe the problem (Gordon, 1961). This analogy is similar to associations with poetic responses. For this reason, it provides a compressed description of the functions or elements of the problem. For example, if people are looking for modification in bicycles chains, they might use the following example: "The problems is like the Indian rope trick".

Fantasy Analogy: This analogy is based on the Freud's notion that creative thinking and the fulfillment of a theory are strongly related. "An artist, for example, has certain creative needs that are satisfied only by wishing for something that is eventually translated into a work art" (p. 186). Synectics adopted this assumption and operationalized it. A way of orienting people's thinking to make this association is asking the following question: "How do we in our wildest fantasy desired the closure to operate?" (VanGundy, 1988, p.186).

Activity 1: Section Five

In order to engage participants in the learning process of metaphors and the Synectics Theory, the activity shown in the Figure 14, should be practiced after the explanation of the content described above. This exercise allows participants to practice the metaphorical thinking to transform visual representations into different forms in order to generate visual ideas. Also, participants might consolidate the information experiencing in their own way the use metaphors to come up with different meanings of the reality. This activity allows participants to guide their metaphorical thinking on different ways by using the four different analogies from the Synectics Theory. After working on the activity, participants might reflect on their experiences using analytical skills in order to gain a better understanding and retain information for a longer time.

Figure 14. Generating ideas with analogies

Generating ideas with analogies

Synectics Analogies

Materials, Supplies and Equipment	• Post-its • Flip charts • Idea handout • Markers • Magazines • Photos • Computers or tables
Goal	Practicing different types of analogies according to the Synectics theory for generation of ideas.
Objectives: *The participants will be able to….*	• Use the four different types of analogies according to the Synectics Theory. • Apply another tool for idea generation process. • Experience another type of thinking to come up with creative outcomes.
Time	30 minutes
Procedure	1. Participants will work in teams of four. 2. Trainer should review the divergent thinking rules as a guide of this activity. 3. Participants will choose one of the elements of the idea handout to improve or transform it into a new, useful and novel product or design. 4. The will use one flip chart per type of analogy. 5. At the top of each flipchart each group will write down the design or product they chose and the type of analogy. 6. Participants will draw or write down the analogies on sticky notes, and they will put it them on the flip chart. 7. The group can use magazines, photos, computers and different resources as inputs to generate analogies. 8. Participants will work on each analogy about 5 or 10 minutes. 9. Trainer should remember the time to the whole group.

Debrief	Participants will describe some of their analogies.
	Consider having participants debrief using the following question:
	- What was most challenging?
	- What did you noticed?
	- What analogy was the most challenging to work with?
	- How are you going to apply this tool in the future?
	- What was most helpful about this activity?

This activity will provide participants with a better understanding of metaphors and the Synectics Theory's analogies and how they can use it for generating visual ideas. The metaphoric learning from this activity will bring an opportunity to participants to make a link between the content and the task to complete it. Thus, the information will be remembered more easily and they will transfer it to a real situation. Recognizing the potential use of metaphors in the creative process participants will be able to understand not only how to apply them, but also how to recognize the world with different meanings and take advantage of this in their creative process. Furthermore, debrief of the activity will allow a critical reflection of the experience and an understanding of how participants can apply the learning in their own life.

SECTION SIX

Introduction

This section is focused on describing the blocks to creativity and how visual thinkers experience them. Since this is the last part of the workshop, the section is focused on deliberate information about the obstacles in the creative process. This information will allow participants to recognize their own obstacles in creativity in order to have more control over them and to recognize them as part of their creative process. Along with this information the trainer will provide a handout with techniques and tools from a variety of visual thinkers in

order to offer possibilities to create their own techniques or to follow those that match with their type of blocks.

Objectives

- Recognize the different types of blocks to creativity.

- Show some examples of visual thinkers experiencing blocks in their creative process.

- Describe the importance of recognizing blocks to creativity.

Creative blocks: How visual thinkers experience blocks in their creative process.

In order to describe some of the barriers in creativity, it is essential to start recognizing what makes a person creative. The lack of knowing about this definition is one of the barriers that visual thinkers face. A variety of approaches have been used to describe the distinctive characteristics of creative individuals. Consistent among the many descriptions are some traits and behaviors such as independence in thinking, unusual sensitivity of the environment, uniqueness in behavior, dedication in their work and a tendency to be analytical. Furthermore, creative individuals tend to be open to new ideas, but to reject traditional points of views (Kaufman, 2007). These distinctions also have been used to define people with talent, including people with visual preferences and outstanding skills, such as Vincent Van Gogh, Claude Monet and Leonardo Da Vinci. However, Maslow described a distinction between "self-actualized" versus "special talent creative people" to argue that not only an individual with special talent can be considered a creative person, but anyone could be considered creative (as cited in Davis, 1999a). Other authors have stated the same distinction, such as Richards (1990), who argued that a creative person could be defined as a person who possess everyday creativity and a person with eminent creativity. These arguments have demonstrated that everyone has an opportunity to become a more fulfilled and creatively productive person. According to Davis (1999a), "You need not posses exceptional artistic, literary, scientific, or entrepreneurial talent to consider yourself a creative

person and live a creative life" (p. 6).

Everyone has creative abilities in different levels depending upon many factors and experiences in their lives. According to Davis (1999b), "Some scholars argue that everyone is born creative, but early years of social pressures at home, at school, and in the community destroy lively imaginations and promote conformity" (p. 166). Everything that affects different aspects of the person's life while growing up, effects their creative skills. For example, the education system forms people's way of thinking from an early age. School systems teach the correct way to solve problems and how to judge others' solutions. These are important factors that inhibit peoples' creative thinking.

Heller (2005) argued that fine arts and design teaching models are too limited. The creative abilities of the professionals in the visual industry are influenced by the limitations in the school programs. For example, many design programs were developed in the early twentieth century based on the art, literary, culture, scientific, and political movements of that time (Heller, 2005). Nowadays, many of these programs continue being applied following these old models. Thus, visual thinkers are educated to foster abilities that were required in past times and not with the essential skills that are required for these times, such as the ability to be open to new situations, the ability to observe in detail and the ability to use abstract ideas to transform them in creative outcomes.

In order to increase personal creativity it is essential to identify, recognize, understand and cope with barriers to creativity from the environment, or from inside of oneself. Recognizing these barriers, people are able to be aware of the variety of aspects that influence their creative capabilities, and then modify or take advantage of them. According to Evans (1993), habits are the most prevalent obstacle to creative thinking. They work as guides to perform many of our professional and personal activities. However, habits limit the people's view of the world in a traditional way (Evans, 1993). When people learn habits, they

find stability and security in the familiar, and they stick on their traditional way of doing things. A habit is like a mathematical formula, it has a path to follow, and it brings the same conclusion. Following habits without being conscious of them, people's thinking become more rigid, and thus they inhibit their creative abilities. According to VanDemark (1991), "Laziness and advancing age can contribute to the malady. It can readily be seen that if we feel we must hold on the familiar and are bothered by newness and change, we will be greatly restricted in our creative abilities" (p. 69). Over the years, people's habits become more and more difficult to break, and it is harder to think of new options or possibilities.

On the other hand, a society is not able to work without guides such as regulations, policies, traditions and rules. However, these guides often repress people's creative thinking. For example, in bureaucratic structures, it is difficult to find creative flexibility in their processes. Something similar happens in traditional organizations with rigid structures and highly specialized employees. Such employees usually follow the same procedures and tend to solve problems using the tools they know best. Furthermore, specialized professionals usually avoid taking risks and trying new procedures, particularly when mistakes are penalized (Davis, 1999b). These structures, habits and rules can inhibit people in their willingness to use their creative thinking.

These creative blocks are experienced in the same way for visual thinkers. Graphic artist's work is full of techniques and rules to develop creative visual representations. In addition, the work of visual thinkers might be restricted or limited by the resources they need to shape their work, such as materials, tools, supplies and equipment. These guides and resources influence directly in reducing versatility of their creative outcomes. Urs Furrer, a visual-effect artist, described:

"Post-production and visual effects is often a very technical world to inhabit. The eternal struggle is to make things looks as real as possible, but when you break

things down into layers, pixels, render passes, and so on, they become so far

removed from flesh-and-bloody reality. Perfectly sharp, glossy- and so not real,

but really constructed" (as cited in Coronell, 2012, p. 144).

Another factor that blocks the creative thinking is the way people perceive the world.

According to the dictionary, perception is the act or faculty of apprehending by means of the

senses or of the mind, cognition and understanding (Zeitgeist, n.d.). Thus, it seems that

perception is the use of the five senses, the thought process and intelligence working together

to see and recognize the external world. This recognition process is learned over the years,

and it is affected by many different factors such as genetics, external inputs, and education.

People perceive things from the world in familiar ways, which makes it difficult to identify

new patterns, ideas or meanings (Davis, 1999a). Thus, any perceptual obstacle that people

experiment is going to influence negatively in individual creative abilities.

People have a notion of their world form their knowledge that at the same time affects

their perception (Solso, 1994). Humans actively seek answers to questions even during the

vision process. In order to answer these questions people solve their doubts using their

expectations to fill the gaps of the reality. "When we process other types of more complex

images, we do so in light of their context and the knowledge we have acquired through a

lifetime of familiarization with the object" (Solso, 1994, p. 112). Our brain looks for visual

patterns to find some recognizable stable forms, and we relate them to the context of the

entire scene and make a connection with our previous knowledge. This natural process does

not allow people to isolate visual components or make new visual connection from the world

causing perceptual blocks to creativity

Another factor that interferes in people's creative thinking is "emotions". Since the

human mind is complex, its capabilities are not governed by the intellect alone. Emotions and

attitudes together, along with a frame of mind, control people's feelings. The emotional state

plays an important role in the intellectual responses and the creative endeavors (VanDemark, 1991). Emotional blocks to creativity include fear of making mistakes or taking risks, incapacity to tolerate ambiguity, a preference or desire for order or conformity, a preference for judging ideas, a lack of control over imagination, and inability to distinguish between reality and fantasy (Evans, 1993). Theses blocks come as a result of some feelings, such as anger, fear, anxiety and hate. More constant emotional blocks are comprised by chronic sources of insecurity, fear of being different, fear of ridicule, fear of supervision, timidity and poor self-concept. VanDemark (1991) pointed out, "We may be afraid of being wrong, being challenged, or we may even fear to learn that our best may seem none too good. But to be creative we must reach beyond where others have reached before" (p. 70).

Visual artists experience emotional blocks during their creative process. According to Hirst (1992), the emotional blocks that affect the creative process of visual artists have been defined as psychological blocks. One of these obstacles is the lack of faith or negative attitude in the flow of ideas of painting. This block relies on the chronic sources of insecurity such as the poor self-concept or anxiety about self-esteem. Another emotional block experienced by visual thinkers is the overwhelming of unconscious material that might be revealed in the painting. Since the visual representations are strongly related with the affective and motivational systems of artists, visual outcomes become ways of expressing unconscious aspects that are strong connected with emotions. Thus, the inability of handling emotions can influence in the artist's creative process.

Hirts (1992) pointed out that some artists' feeling that produce creative blocks are: "frustration at not being able to fully express an idea on canvas, lack of objectivity, the sense of struggle without accomplishment, and the inability to make decision at that moment" (p. 82). Particularly, a common feeling among artists is the fear criticism. These blocks involve negative emotions and build barriers that stop the flow of creative thinking. Kim Holm, a

motion designer and digital artist described, "I believe creative block is closely connected to fear: fear of my ideas not being good enough. When I find myself in a rut, it's usually because I've started losing confidence in my ideas" (as cited in Coronell, 2012, p. 80).

Other factors that affect the creative abilities are social influence, social expectations, and conformity pressures. These social implications are called cultural or environmental barriers. The forces that affect our patterns of behaviors, feelings, attitudes, value systems, religion, education and group norms are defined by the cultural patterns. These forces inhibit people's freedom of thought because they guide what people should feel and believe. The social pressures make people feel uncomfortable to be different and to adapt new ways of thinking and behaving. In addition, people learn that it is good to be correct and bad to make mistakes (Davis, 1999). People learn that being wrong means that they can be criticized, rejected or ridiculed. Being different or wrong raises the fear of being judged. VanDemark (1999) stated, "Being creative in that kind of situation often means we must risk losing our cherished membership" (p.201).

According to Wilson (2010), photographers and filmmakers that experience creative blocks should change their lives, go on a trip or spend year being of service, in order to overcome them. When people move out of their comfort zones, they are able to observe their lives from different perspectives and expand their visions, not only from the external world, but also from their internal system of beliefs and thoughts.

Another barrier that inhibits creative abilities comes from people's thoughts and how they express themselves using specific words or sentences. This internal barrier is called "idea squelchers". They are comprised by the common comments that reinforce the cultural blocks from habits and traditions that are part of people thinking. The Figure 15 shows some of the ideas squelcher collected by Davis (1999a).

Figure 15. *Idea Squelchers*

| It can't be done. | I don't see the connection. |

Too old fashioned.	Let's wait and see.
Not that way.	It's too late
You don't understand the problem.	That's not our job.
See? It didn't work.	It doesn't matter.
We are not ready for it yet.	Our people won't accept it.
We need more lead time.	You can't argue with success.
Be practical	We have too many projects now.

From Davis, 1999a and the Journal of Creative Behavior

The main advantage of recognizing these barriers to creativity is the anticipation to the resistance that may experience during the creative process. Also, analyzing the blocks to creativity in details helps people to identify internal and external obstacles that inhibit an individual's creativity. Thus, people can take the right actions to overcome them as is described in Appendix D.

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APPENDIX A:
Idea Handout Version I
Brainsketching

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APPENDIX B:
Idea Handout Version I
Brainsketching

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APPENDIX C:
Idea Handout
Metaphors

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APPENDIX D:
Handout Blocks to Creativity
Tools and techniques to break blocks to creativity for visual thinkers

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