RESEARCH

THE 'DESIGN THINKING' AS A RESOURCE AND METHODOLOGY FOR VISUAL LITERACY IN PRESCHOOL AT MEXICAN MULTIGRADE SCHOOLS

El Desing Thinking como recurso y metodología para la alfabetización visual y el aprendizaje en preescolares de escuelas multigrado de México

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ABSTRACT

The aim of the study is to carry out a research on the influence of the Design Thinking as a resource and methodology in educational contexts in order to promote an active learning in preschool students at Mexican multigrade schools. These tools and methodologies will act as a key to transform learning environments in Preschool Education at rural schools. The results reveal that innovation can be introduced at these schools through communication and visual language, increasing the chances of success, without having to increment the number of resources or improve their infrastructures. Training and innovative and creative development of the educator, as well as a proper use of communication and *Visual Literacy*, as parts and motors of the learning, will help students to develop and strengthen their creative, innovative and critical thinking. Likewise, focusing on educational ways and learning areas promote a bidirectional and highly enriching attention. That's why educators have to be trained in research, discover, imagining and solving problems in a divergent way in real situations, would

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be the one who lead this learning and transformation process of the classroom of Children Education.

KEY WORDS: communication - visual literacy - design thinking - creative in education - preschool education - multigrade schools - Mexico.

RESUMEN

El objetivo del trabajo es realizar un estudio sobre la influencia del Design Thinking como recurso y metodología en contextos educativos, con el objetivo de promover un aprendizaje activo de los estudiantes preescolares en Escuelas Multigrado de México. Estas herramientas y metodologías activas actuarán como clave para transformar los entornos de aprendizaje en la Educación Preescolar en escuelas rurales. Los resultados afirman que se puede introducir la innovación en estas aulas a través de la comunicación y el lenguaje visual, aumentando las probabilidades de éxito y sin necesidad de incrementar el número de recursos o mejorar sus infraestructuras. La formación, capacitación y desarrollo creativo e innovador del educador, y el uso de la comunicación y la *Alfabetización Visual* como piezas y motores de aprendizaje, favorecerán el desarrollo y fortalecimiento del pensamiento creativo, innovador y crítico. A su vez, poner el foco en los estilos y espacios de aprendizaje permitirá una atención bidireccional y sumamente enriquecedora. Por ello, el docente capacitado para investigar, descubrir, imaginar y resolver problemas de forma divergente y en situaciones reales, ha de ser quien lidere este proceso de aprendizaje y transformación del aula de Educación Infantil.

PALABRAS CLAVE: comunicación - alfabetización visual - design thinking - creatividad educación - educación preescolar - escuela multigrado - México.

O DESIGN THINKING COMO RECURSO E METODOLOGIA PARA A ALFABETIZAÇÃO VISUAL E O APRENDIZADO EM PRÉ ESCOLARES DE ESCOLAS MULTI GRAU DO MEXICO

RESUME

O objetivo desse trabalho é realizar um estudo sobre a influência do Design Thinking como recurso e metodologia em contextos educativos, com o objetivo de promover uma aprendizagem ativa dos estudantes pré-escolares nas Escolas multi grau do México. Estas ferramentas e metodologias ativas atuaram como clave para transformar os entornos de aprendizagem na Educação Pré-escolar nas escolas rurais. Os resultados afirmam que se pode introduzir a inovação nessas aulas através da comunicação e a linguagem visual, aumentando as probabilidades de êxito e sem necessidade de incrementar o número de recursos ou melhorar suas infraestruturas. A formação,

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capacitação e desenvolvimento criativo e inovador do educador, e o uso da comunicação e a Alfabetização Visual como peças e motores de aprendizagem, favoreceram o desenvolvimento e fortalecimento do pensamento criativo, inovador e crítico. Pôr o foco nos estilos e espaços de aprendizagem permitirá uma atenção bidirecional e sumamente enriquecedora. Por isso o docente capacitado para investigar, descobrir, imaginar e resolver problemas de forma divergente e em situações reais, serão os que lideram este processo de aprendizagem e transformação da aula de Educação Infantil.

PALAVRAS CHAVE: comunicação – alfabetização visual – design thinking – criatividade educação – educação pré-escolar – escola multi grau – México.

How to cite the article:

1. INTRODUCTION

The educational processes are constantly being transformed towards the permanent search for answers to the needs of the students and to the diversity of the educational contexts that education faces.

Encouraging the implementation of constructivist approaches in preschool education, is an alternative that transforms the role of educational actors by opening up new forms of communication between educator and student, and encouraging the development or the strengthening of the competence of learning to learn, permanent learning and the development of autonomy, among others.

Preschool education is a crucial stage in the cognitive and social development of the human being, since biological and cultural processes are gestated that allow the learning of skills that are key in the future way of processing ideas and solving problems. This represents one of the main pedagogical challenges of the educator who, faced with a globalized society, has to implement and propose those strategies that fulfill this task, together with the specificities of the context in which the schools are found, such as the case of rural contexts where multigrade schools are mostly maintained. An educational space in which age and level of knowledge should not be a barrier to social integration or to the development of learning.

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The multigrade school is an educational service where students of different ages work in the same space or classroom. This generates that the professor has to diversify his didactic strategies to assist the differences of ages and educational needs of the students. One of the current priorities of the National Education System in Mexico is to respond to the challenges that the multigrade school represents. Currently the INEE (2017), raises the haste to reduce the inequalities and difficulties that characterize these schools, such as the shortage or lack of teaching resources, furniture, basic public services, as well as precarious physical structures.

In view of this, this service and educational level require, with greater zeal, innovative teaching proposals that allow the development of alternative ways of teaching the senses, creating activities that motivate creative thinking, in agreement to an era in which global challenges demand specific forms to think about education for both local and national or state, and international entities (INEE, 2017).

Based on this approach, the present study has been developed, which is based on the development of pedagogical proposals and new active teaching methodologies based on the *Design Thinking* as a key tool to transform these new learning environments in preschool education in Mexico. In addition to introducing innovation in these classrooms and the contact with communication and visual language, the inequality gaps and increasing the chances of success, since its use as an alternative of communication and innovation in teaching is viable in this context because they do not imply significant financial investments, or are limited by the precariousness in terms of infrastructure in which some schools could be found.

In this sense, it depends on the creative and innovative act of the educator, to incorporate elements of the context and to the Communication and *Visual Literacy* as essential pieces and strategies that contribute to the development and strengthening of creative, innovative and critical thinking.

In this context, it is worth highlighting an international example of this work methodology and it is found in the Harvard Zero project that has led to research projects in educational psychology associated with creative processes. The main objective is to develop learnings that have utility in the life of the future and that serve as extension connections to favor high-level comprehensions in the real life of the students. That is, to improve the education, the teaching, the thinking and the creativity in the arts, as well as in humanistic and scientific disciplines, at an individual and institutional level in a variety of contexts including schools, companies, museums and digital environments *(Ritchhart and Perkins, 2008).*

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2. OBJECTIVES

Analyze and present the innovation alternatives that *Design Thinking* can achieve in educational communication and teaching in multigrade preschools.

3. METHODOLOGY

The research work is documentary, since it has been developed through the review and controlled analysis of the most representative literature on the object of study. According to Hoyos (2000), documentary research aims to achieve critical understanding of the phenomenon of study through the contributions of the diversity of views and positions of experts in the field.

A state of the question was done, that consists of a brief presentation of all the main existing results in the research is made about the approach of this work. That is, its purpose is to point out the search paths that have been opened, up to the present and for the future for research (Esquivel, 2013). After this, information was systematized with the methods and main findings of similar studies, proving that the study in development was unprecedented to find no vestige of identical studies.

It was determined that, in order to strengthen this study, investigations were required with complementary or transversal themes that would allow strengthening the arguments necessary for the proposal. The studies that have been reviewed were, therefore, on different topics, such as the neurosciences and creativity, perception and learning and educational policies, among others.

Considering the recommendations of Cué, Díaz, Díaz, and Valdés (2008) in relation to the review and investigation of documents, the criteria for the selection of information that were addressed in the present work, have been based on the documentary analysis of articles and relevant publications indexed on the subject and the geographical context; as well as educational institutional sources with successful experiences in the subject.

Likewise, the statistics of the Mexican National Education System were collected, specifically the Preschool Education in multigrade contexts, strengthening previous experience of the authors in these school settings, for thus making proposals and conclusions that prove the feasibility of the method.
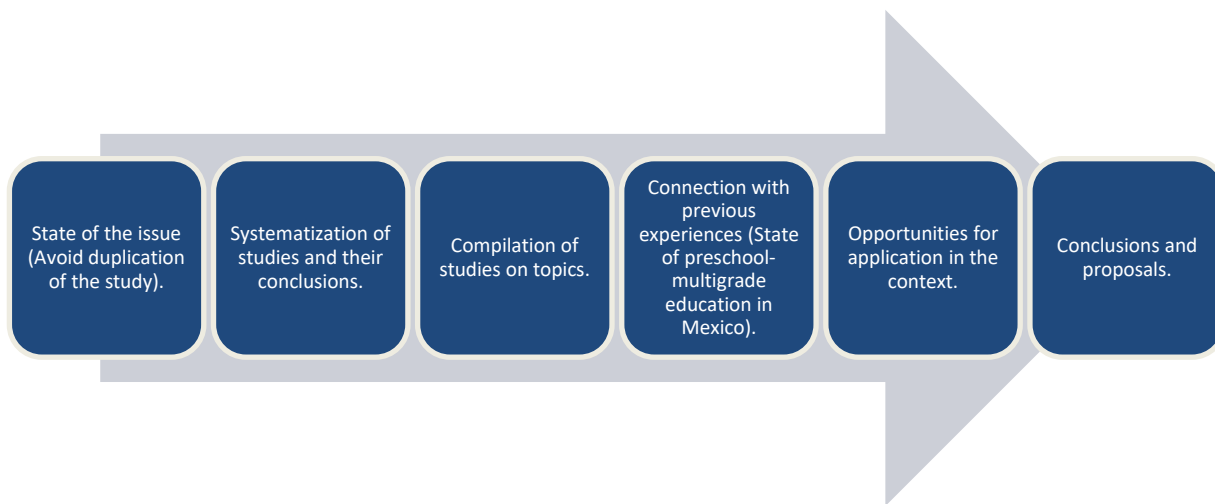
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Figure 1. Research method.
Source: Own elaboration.

Currently there are no works or research on *Design Thinking* and its application as a teaching and communication technique in a specific context of Pre-school Education, much less in multigrade contexts. However, some experiences in digital media destined to preschoolers who have applied this methodology were found, although such disclosure is purely informational only or, for commercial purposes, since they are students who are not in multigrade studies.

By way of justification for this reasoning, some similar studies are exposed to processes of creativity, visual thinking and critical in Children Education that were found with the aim of presenting the state of affairs.

Table 1. Comparative analysis of studies on Visual Literacy through Desing Thinking.

Study	Author and year	Country	Method	Main findings
The language of the image and the development of the critical attitude in the classroom: didactic proposal for the reading of visual signs.	Barragán, R. and Gómez, W. (2012).	Colombia	Investigation action	The reading of images is able to promote the critical attitude in students to the same extent that reading the written text does.
Didactics of Plastic and Visual Expression in Early Childhood Education.	Carrascal, S. (2016).	Spain	Descriptive	Plastic expression is a means of expression, communication and language that develops creativity in early childhood education.

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Assesing student's critical thinking performance: Urging for measurements using multi-response format.	Ku, K. (2009).	China	Explanatory	Critical and creative thinking is generated with visual didactic materials.
Visual Thought: a didactic proposal to think and create.	Lazo, N. (2017).	Peru	Investigation action	One of the forms of communication is the visual thought that in a free, didactic, fun and challenging way activates the neuronal cells.
Design thinking and collaborative learning.	Leinonen, T., and Durall, E. (2014).	Finland	Experimental	Design thinking is a significant approach in collaborative learning research
The Design Thinking methodology in educational innovation.	Seoane, M. (2016).	Spain	Documentary film	The Design Thinking methodology allows the creation of marker skills, that is, of inventiveness, creation and innovation.

Source: Own elaboration.

As it can be seen (Table 1), seven studies have been selected in indexed databases and high academic reputation, which allowed to collect some visual literacy application in school settings with the Children Education. Basically, studies were located in European, Latin American and Asian countries, most of these studies with a methodology that collects experiences in the classroom.

The results allowed to find data that demonstrate the benefits of the methodology for the formation of creative thinking, innovation of teaching and an alternative and functional way of communication, especially through visual thinking.

4. RESULTS

Approach to the current context of multigrade preschool education in Mexico

The level of Preschool Education in Mexico, which is aimed at children from 3 to 6 years of age, has faced countless challenges to It is recognized as the first link in Basic Education of the National Education System; In addition, the multigrade school continues to be an emerging theme in the country's educational policy agenda.

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The composition of the national education system has been designed as a response to the forms of organization, the diversity of interests, social groups and demographic needs of the Mexican context.

Taking this into account, the Ministry of Public Education, supported by the National Council for Educational Promotion, offers pre-school education in its various services such as general, community and indigenous; in this way, the guidelines stipulated by the General Law of Education are met, which alludes that education in Mexico must respond to the specific, cultural and social characteristics of the indigenous, migratory and marginalized groups of the country (General Law of Education , 1993).

Ames (2004) refers to the multigrade school as the school space where a teacher is responsible for catering to more than one or two grades at a time. In Mexico this term has been implemented for the Primary Education, however, today it is also used for Preschool Education.

One of the peculiarities of the emergence of these educational centers it is the educational alternative of bringing education to dispersed areas, in which rurality is the main scenario (Juárez and Rodríguez, 2016 cited in INNE, 2017).

Table 2. Unitary Preschool Schools in Mexico.

School cycle	Schools of preschool education	Unitary Schools
2012/2013	91,215	23,923
2013/2014	91,141	24,126
2014/2015	90,825	22,477

Source: Prepared by the authors from Panorama Educativo de México.
Indicators of the National Educational System 2013, 2014, 2015.
National Institute for the Evaluation of Education. Mexico.

Table 1 shows that the multigrade school, considering it exclusively in its unit modality[2], for the 2012/2013 school year it represented 26.22%, for the 2013/2014 school year, 26.47% and for 2014/2015, 24.74% of the total of preschools in the country. The foregoing, refers to the high degree of visibility that this service has in Preschool Education in Mexico; which places it in an important place in the formative and statistical impact of the country's education.

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[2] In this case, an educator is responsible for the administration and organization of the school and the simultaneous attention of the three educational levels that make up the Preschool Education (Ames, 2004).

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Regarding studies carried out in this construct, it has been demonstrated that multigrade education can be efficient as long as various aspects are taken into account that make it possible to exploit its potential to the maximum (Ames, 2004). Consequently, the INEE (2017) recovers international and national suggestions based on studies carried out in educational centers of the country with the purpose of improving and enriching the conditions and teaching-learning processes that emerge from these contexts.

In view of the above, it is urgent to adapt and maintain physical spaces with architecture and conditions appropriate to the development of educational processes; the existence and availability of sanitary facilities and basic public services; access to various materials and/or educational resources; the availability of school furniture, as well as the regulation of the number of students per educator, among others (INEE 2010) and (INEE, 2017).

The social, cultural, geographic and demographic disparity of the country have been a limitation for the full exercise of education in areas of backwardness and rurality. It is necessary that the educational authorities, as well as educators and the community join efforts that enable a different positioning of this service.

Design Thinking as a learning tool

Ramos and Wert (2015) define *Design Thinking* as a methodology capable of generating innovative ideas, which focuses its effectiveness on understanding and solving real needs. It comes from the way that product designers work. Hence its name, which in Spanish is literally translated as *"Pensamiento de Diseño"*. It began to develop theoretically at Stanford University in California (USA) from the 70s. During the process, techniques with a large visual and plastic content are developed. This makes us put both our creative and analytical minds to work, resulting in solutions that are both innovative and feasible at the same time.

Their process is summarized in five step s: empathize, define, devise, prototype and try.

Figura 2. Proceso Design Thinking.
Fuente: Ramos y Wert (2015).

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The first stage *Empathize,* is defined as the process through which an effort to understand and comprehend in depth the person, user or the situation on what you want to work arises. *Define* what is the challenge that is expected to be resolved. *Devise*, which involves generating all possible ideas. The next phase tries to transform ideas into tangible elements, the *Prototype* phase consists of build actual products with some of the most promising ideas. Finally, the *evaluation* stage is next, with the purpose of learning from the reactions or experimentations (Castillo, Álvarez and Cabin, 2014).

During this process it is very important that the challenge is well defined, because efforts should focus on resolving this. It is necessary to be clear that during the *Design Thinking* Process, doors can be opened and closed cyclically.

Cordova (2015) referenced and divide the definitions of *Thought* in *Design*, in the following two major approaches:
1. *As a problem-solving process:* where the *Design Thinking* is conceived as those problem solving skills and the adoption of solutions focused on cognitive strategies with the use of aggressive thought and the use of non-verbal modeling supports.
2. *As collaborative innovation management:* It is conceived as a process focused on people, a set of methods of "corporate ethnography", a methodology that permeates the entire spectrum of innovation activities with a design spirit centered on the human being.

Características	Pensamiento de Diseño como Resolución de Problemas	Pensamiento de Diseño como Gestión de Innovación
Modo de Pensamiento	Abductivo	Deductivo/Inductivo/Abductivo
Propósito	Resolver Problemas indeterminados.	Gestionar la innovación en un procesocreativo
Metodología aplicada	"Encuadrar" Problema/Solución.	Analizar-Diseñar-Prototipar-Validar
Tipo de Problema	Indeterminado.	Indeterminado
Modo de Trabajo	Introspectivo/Colaborativo.	Colaborativo/Etnográfico
Conceptos Claves	Problemas Indeterminados, Abducción, Encuadre.	Problemas Indeterminados, Diseño Centrado en las Personas, Estudio Etnográfico
Textos Claves	(Rittel & Weber, 1973; Simon,1996); (Schön, 1998; Dorst, 2011)	(Kelley & VanPatter, 2005; Fulton & (Gibbs, 2006; Brown, 2009)

Figura 3. Comparison between the two approaches of Design Thinking.
Source: extracted from Córdoba (2015) p. 62.

Design thinking, is no stranger to the individual, it is rather a natural and innate human peculiarity. In this context, its empowerment allows our thinking to go to another level, establishing a holistic experience and a multifunctional approach that

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involves a link between more sensitive, critical, creative and powerful tools (Mootee, 2014).

Design Thinking is used in various professional fields, however, this approach has great potential to develop significant changes in the education sector.

It is important to act under the *"learn to learn"* approach, which assumes error as a learning opportunity, fosters teamwork, empathy, creates a visual meaning through dynamism with visual interactions, inspires, invites reflection and reasoning, and provides meaningful experiences. It leads to the decentralization of the classroom, to focus on the needs of the educational community through various research techniques, to anticipate and explore alternative solutions, to place the student at the center of the entire educational process and to encourage the use of tools and instruments that facilitate communication and information transmission processes (Mootee, 2014).

Another aspect that justifies the success of its application in educational contexts is that it implies the strengthening of critical thinking, which is intimately related to improving the ability to think and consequently, allows to put up in a positive way with the changes that life faces.

Lipman (2016) and Howie (2012), consider that this type of thinking contributes to the elaboration of deeper and more responsible judgments, to the comprehension and understanding of phenomena, to the application of knowledge for making decisions, to the production of changes and final products, to raise the thinking levels of the students and raise the levels of self-esteem, self-control and self-regulation; which directly affects their academic performance.

The development of critical thinking as a transcendental element in the methodology of *Design Thinking* invites the teacher to guarantee the diversity and integration of the context, of the educational agents and of the levels of thought, interests and emotions; since this demands from the individual the need to adapt to changes and greater openness to them (Lipman, 2016).

Considering the development of multiple intelligences as essential abilities for solving problems, is another of the characteristics that *Design Thinking* outlines. Hernandez (2004), Seoane (2016), Serrano and Blázquez (2016), agree that it is necessary to strengthen emotional intelligence in students, as well as being a substantial component in the methodology of *Design Thinking* (empathize) It helps to empower the mastery of complex situations, as well as to strengthen interpersonal relationships.

People who use this methodology develop skills such as the ability to observe, analyze, reflect, global perception and criticism; empathy, curiosity and creativity,

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among others; which are not exempt from the educational context (Serrano & Blázquez, 2016). These potential benefits of *Design Thinking* have their epistemological basis in the fact that most of the world we live in is modifiable, something in which we, as human beings, can have an impact. That is, it is a mental state that is characterized by being focused on the human, social, responsible, optimistic and experimental (Leinonen and Duran, 2014).

To enhance the development of *Design Thinking* in Pre-school Education, contributes to the training of future entrepreneurs, inventors and citizens with the skills to solve real problems of their context and beyond this with a high degree of creativity. However, for Mootee (2004) the success of this methodology, in any context, depends on the recognition and respect of each of its principles.

In addition to *Design Thinking, it* is important to clarify that there are other methodologies that have similarly proven to generate skills similar to those *of design thinking*, such as project-based learning (PBL), game-based learning, game thinking (Game Thinking) giving rise to a motivating work that stimulates creative and innovative thinking (Gonzales, 2015).

Communication as a vehicle for the transmission of knowledge

Escandell (2004) defines *communication* as a process of transmission of information through codes. As human beings we have the ability to get and share information through different linguistic forms. Faced with this, communication processes include decoding, inference and intentionality; as the ability we have to obtain, reason and above all transmit information with a focus more adapted to the context.

The formative processes invite to maintain a close relationship between the educational subjects (educator-student), compulsorily mediated by communication processes. Communication allows the transmission of information and knowledge, therefore, it is an important foundation in formal education as a vehicle that, applied in a timely manner, will provide a broader and wider conceptualization of the world to students.

To describe the process of communication and its elements, it is desirable to apply the information theory of Shannon and Weaver (1949) with further extensions and applications to various fields of science, the process includes a transmitter, a receiver and a channel permeated by codes and contexts that determine the comprehension of a certain language that is not necessarily determined in oral or written ones (Ramírez, 2017).

Contextualizing the subject to communication in the classroom, it is important to consider these levels, since they can be an obstacle to understanding messages that compromise the teaching-learning processes.

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On the other hand, both the educator and the student act in learning as emitters and receivers. Valenzuela (2004) states that children who are taking Preschool Education are in a process in which they are learning to be *emitters*. Therefore, it is possible to affirm that the child's expressions are related to the broad or little baggage of experiences with those that count according to the context in which they have developed, where previous knowledge and experiences convert them and characterize singular emitters. However, when the roles are reversed and the learner assumes the role of *receiver* and the teacher assumes the role of *emitter,* the teacher is expected to transmit clear and contextualized *messages* to the maturity levels, both physical and cognitive, of the students (Valenzuela, 2004 and Escandell, 2004).

In the communication process, both the *emitter* and the *receiver* must share the same *code*. That is, share the same language, which can be both verbal and/or non-verbal. Valenzuela (2004) invites the educator to take up the theories of child development raised by Vygotsky, which assume that the school should provide significant opportunities and experiences to the child, that favor and strengthen their development at the lexical, syntactic, pragmatic and phonetic levels.

Ferreira (2007) suggests the application of *Corrective Feedback,* as a strategy that provides significant elements of the appropriate use of language in the communication exchanges that arise within the classroom between educator-student and student-educator. However, the success of this is accompanied by actions such as the acceptance and internalization that students can make in relation to the contributions that the teacher provides, as well as the forms and strategies with which it provides feedback.

Narrate stories, tales, hold dialogues and conversations, explain and argue ideas, describe objects, people, among others; as well as promoting the capacity of speaking and listening between the educator and students, are activities that expand the opportunity of verbal communication of the students and therefore nurture their language, achieving progressively and more clearly identify the functions and characteristics of this one (SEP, 2011).

The classroom is the ideal space to enrich the development of cognitive abilities of boys and girls, in which they have the opportunity to communicate with various interlocutors. Communication is immersed in the teaching-learning processes in its entirety, the proper implementation of these processes in the school involves children to use more reflective, broad, extensive, rich and precise languages.

Visual literacy and its influence on the development of creative thinking of children

Our ancestors have used various forms of communication to observe, record and transmit messages about what they observed. At present, these forms are no exception,

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since it is necessary to learn to look, understand, decode and comprehend what the various messages seek to communicate and promote conditions to generate creative individuals in these processes.

Currently, visual language is present in all information dissemination. Villa (2008) considers important that, from the classroom, the understanding of the diversity of texts be encouraged, that is, not only verbal texts. The understanding of these texts requires a process and preparation, as well as the understanding of iconic texts which implies a knowledge of the elements that constitute the visual language.

The communication through the word should generate greater understanding of the messages, that is why it is important to learn to emit clear, fast and effective messages that facilitate the receiver his understanding. Using good and clear words, discriminating between good and bad ideas invite the student to maintain a broad and sustained vision of the idea that is expected to be transmitted.

In this sense, Roam (2011) proposes the implementation of *vivid thinking*, which entails to the use of the transversality of the routine nature of words with the accompaniment of images. That is, the incorporation of visual media in communication processes, since together they provide a complete interpretation of the world.

Aparici and García (1998) consider visual images as signals that convey specific messages, different from the structure of the language. They consider visual literacy as the process through which an individual decodes and encodes visual elements and implements them to situations that are alien to the teaching-learning processes. Nevertheless, to reach this stage it is considered necessary a training in which the knowledge of the image is introduced and directly involve aspects related to audio-visual and sound topics, among others.

Therefore, we can say that the image reading process lacks certain conditions of use of extra - verbal language, and both the design and the reading the message, demands certain skills and abilities from the emitter or receiver. Therefore, we consider this scenario a great opportunity to provide and open a door to new knowledge and learning.

Working with projects involving the use of images, invites the educator to review the methodologies that he generally implements. It is important that the teacher knows the morphosyntax and semantics of visual language. That is, the concepts, stages of development, the enunciation and the elements that give meaning to the visual composition: rhythm, color, line, dot, shape, texture, plane (Villa, 2008).

Roam (2010) considers that visual thinking is based on a four-step process, which are important to strengthen the skills and abilities of visual thinking, which can be implemented in a random way. The first, *Look*, supposes the subject to absorb and collect visual information about the environment; *See,* implies giving it a greater meaning and being aware of what is seen; *Imagine,* is to see beyond with closed eyes; and *Show,* is the final step of the process and is to represent all our ideas and perceptions of what we have seen on paper.

Therefore, some activities related to the reinforcement of visual thinking that could be applied in educational contexts are: to make panoramic tours of the context, to identify what is in it; categorize and organize what we see, identify differences and similarities, invert the images and analyze if important changes occur in them, question and annotate the observed, as well as to expose an idea or a word and draw something related to it (Roam, 2010).

As stated by Aparici and García (1998) and Villa (2008), the use of audiovisual media in the learning processes promotes in the students the retention, increased interest and critical analysis, as well as a more complete understanding of the knowledge and the world that surrounds them. However, within the fundamental objectives of *visual literacy* is to train more critical individuals, able to establish harmony between reflection, reasoning, thinking, feeling, understanding and pleasure. That is, they can find the true meaning and message that the images, signs and symbols seek to transmit.

On the other hand, Robison and Arónica (2009) and Vecina (2006), define *creativity* as the ability and/or capacity to create, a form of change. A process of progress and adaptations, related to decision making and problem solving through which we bring into play our knowledge and intelligence.

Generally, we relate the theme of creativity to artistic themes. However, it is not limited to this. To understand this domain in depth, our conception of creativity should be broad and open to the possibilities of finding it immersed in each field of development of the subjects. Given this, the opportunities to enhance it in subjects become infinite (Carrascal, 2016).

In this same line, the psychometric approach directly addresses the previous statement, since it assumes creativity as a part of the essence of every individual, recognizing that every person is potentially creative to a greater or lesser degree.

It is convenient to return to *creative thinking* as a factor that, if focused on education, symbolizes the ability to acquire tools and strategies, which enable the resolution of problems, the readiness to change obtaining significant learning and the transformation of the individual (Pacheco, 2002).

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Research and contributions related to the study of creative thinking aimed at understanding the ways to solve problems, determine that individuals with a high degree of creativity apply the same cognitive processes. However, they use them with ambition, efficiency and flexibility. It also concluded that individuals with high levels of creativity take life with a philosophy, where the need to create and innovate allows them to function with greater reflection, passion and commitment Gardner (cited in Pacheco, 2002).

Considering that through divergent thought you open the door to creativity in all circumstances and that lead to reasoning, reflection, analysis, among others; the importance and need to adequately stimulate and promote the development of creativity during childhood arises.

Renzulli and Reis (2007) propose to enrich the curriculum of Children Education with experiences that involve creative processes involving the imagination with a social bond that allow children to propose solutions to their environment and with the peculiarities that this entails.

Based on this analysis, the relationship established between visual literacy and the potentiation of creativity in preschool students has become evident.

The activities that are implemented within the classroom must consider the context, the specific and educational needs, as well as the development processes of the students. To work the transversality of the contents to encourage creativity through various techniques, materials and procedures that enhance the appropriation of new skills related to the expression and visual appreciation, as well as a boost to self-esteem. Carrascal (2016) proposes to incorporate a space within the planning in which the basic concepts (materials, techniques, color, light, textures, among others) that are immersed in the teaching of visual education are retaken. Likewise, he considers the incorporation of technological and computer resources as tools that can support the teacher to work with visual expression. Therefore, we can conclude that the use of these allows to strengthen and deepen contents related to the culture and iconicity of the students.

Also, you can apply other to activities such as reading and denotative analysis of various productions (photographs, paintings, etc.), from the description of the basic resources of the composition, the setting and the characters to delve into the narrative structure) the descriptions of objects and personal (Barragán and Gómez, 2012).

The use of tracing, templates or monotypes, the incorporation of recycled materials to make collages, graphic and plastic works, create objects and sculptures with different materials, among others; as well as the use of dialogue between the educator and the students, are situations that have a great influence on the teaching-learning process. Manipulation and experimentation with different materials contribute to the motivation,

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attention and reflection of the students, as well as the internalization of specific skills that are necessary for effective development. The former are a series of activities and related oriented to foster imagination, creativity, analysis, problem solving, collaborative work of preschool girls and boys (Aparici and Garcia, 1998; Moreno, 2015; Carrascal, 2016).

For these processes to be effective, the teacher must provide experiences that show the discrepancy between the current thinking of the students and the level of training they could achieve, without losing sight of the importance of these developments occurring naturally, that is, as strategies that directly address the needs, concerns and initiatives of children. Therefore, Barragán and Gómez (2012) manifest the need to have teachers aware of the processes of acquisition and development of artistic languages, as well as reflective and critical teachers, capable of generating, through their experience.

These didactic strategies in Preschool Education generate a relevant research and interest field to understand creativity from all its approaches and variables, because the differences between fields in the nature of creative thinking, and the effects of creativity in people and social systems need a more complete treatment, such as the publication of creative research manuals by Mark Runco and Robert Sternberg (cited in Mumford, 2003), which represents an important step towards the development of a coherent scientific model of the creative act.

Design Thinking as a tool to transform the educational context in the multigrade preschool

From the analysis and the referents of the peculiarities that print the multigrade school context, where the educational processes are developed in Mexico, it is proposed to focus on *Design Thinking* as an educational proposal that contributes to the strengthening of these educational scenarios.

According to Lipman (2016) one of the singularities of the development of critical thinking as a transcendental element in *Design Thinking,* is the nobility of this for the adaptation and consideration of the context, since it retakes its global circumstances, conditions and configurations; it is oblivious to all forms of stereotypes and prejudices; and it is based on the principle of formal logic and deep and analytical thinking.

One of the fundamental bases for the obtaining of favorable processes and results through *Design Thinking,* is in the creative participation of those involved, insofar as elements characteristic of the social, cultural and physical context of these spaces are integrated they will develop experiences that for children will have a greater sense and meaning of the reality that surrounds them.

For this, it is important for educators to stimulate creative work, because the innovative without innovation has no significant contribution to the education of

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children. Therefore, it is important to create with innovation and social sense, where the discipline, correctly used, can create methodological ways of thinking, designing and proposing creative solutions (Paul and Elder, 2004).

Both communication and visual literacy contribute to the strengthening of the cognitive and affective development processes of the students. In the *Design Thinking,* the communication becomes relevant through Corrective Feedback. Steinbeck (2011) considers it necessary to contribute to students to arrive to an understanding of what is needed to project their proposals on real events.

Focusing on the ideas of Arheim, Roam, and Molla (cited in Lazo, 2017), with respect to visual literacy *and* its relationship with *Design Thinking,* it is concluded that the true scope and meaning of this concept is in the ability to see, discover, appreciate, retain and transfer ideas with all our senses, making it possible to identify and recognize what is invisible to the naked eye.

This analysis relates to communication processes arising in the educational context, with the five steps proposed methodology *Design Thinking*.

Table 3. Design Thinking and the communication process in the educational context.

Process Design Thinking	Design Thinking and communication in the classroom	Experiences of Design thinking as a teaching medium in pre-school education in Mexico.
Empathize	Communication that revolves around the dialogic, with questions that encourage curiosity. Observation and the way in which the educator empowers it are crucial in this phase.	1. The network of Semper Altius schools 2. SEK Santa Isabel 3. American School of Tabasco Similarly, initiatives of non-formal education, how to:
Define	Communication links are established in order to classify the observed, that is, it is a way to promote visual literacy, it generates a communication that seeks an intersubjective trust between educational actors.	1. "Papalote Children's Museum" 2. "Droneproject.org" 3. "Oaxaca minifaker air"
Devise	The child can represent all possible ways to solve a problem, expressions of oral, artistic, etc.	
Prototype	The boy is a designer and an artist to build a product that brings their creativity to a social cause level.	
Test	The child tests and demonstrates his progress.	

Source: Own elaboration.

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In Table 3 the methodology of the *design thinking is* presented in its five stages, associated with the processes of educational communication in the classroom, where it is proposed and described how to achieve a dialogic relationship that allows this process to be bidirectional and non-linear. This situation favors that both educational actors feedback the processes of invention, creation and critical thinking until they reach opportunities for solution. That is, it is a direct demonstration of the traditional processes of student-teacher relationship, therefore, it is an opportunity for innovation and transformation of educational spaces and the formative processes of children.

The experiences of *Design Thinking* as medium of instruction in the preschool education in Mexico, were collected through public information of the preschool level. These experiences are linked to the maker movement that seek to create technological prototypes to solve real and hypothetical situations that allow the child to develop creativity and technological skills, specifically in computer science and electronics; although they also show evidence of projects carried out without this type of technology, using recycled and plastic materials, as they make explicit that it is a fusion of artistic education, science and humanism.

The initiatives of non-formal education exposed, are initiatives of state governments and public universities, with the goal of bringing to children the opportunity to learn skills related to technology and creativity, but they do not involve the development of a formal curriculum. These are facilities that are usually visited by schools and the general public.

5. DISCUSSIÓN

The interest in this type of educational strategies arises from the desire to replace the learning acquired from memory and repetitive, by those who attribute greater importance to learning to think and develop creativity as apprehensible and modifiable skills. Starting from the assumption that education should have as an important part of its objectives, the stimulation of creative thinking and the development of cognitive abilities (Ku, 2009).

Multigrade preschool in Mexico is, without doubt, an educational space with unique characteristics. It develops in contexts that present certain limitations related to infrastructure, furniture, didactic resources, economic resources, public services, among others. However, faced with these limitations, the richness of one's environment does not cease to be present at every moment, which symbolizes a great opportunity and a magnificent tool for the construction of learning and the solution of real problems.

From the proposals of the classic theories of the psychogenetic constructivism of Jean Piaget and the social constructivism of Vigotsky, an Education was advocated that

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would encourage the formation of inventors, creative, innovative, able to transform their environment with social responsibility, without reproducing schemes that hinder the progress of Science and Culture (Carrera y Mazzarella, 2001, Mounoud, 2001).

Although the materials or means in rurality are different, creativity is an attitude and a praxis that allows to create concrete methods of solution. Moreno (2015) states that as long as the materials meet the criteria of support for learning, the structuring function and the motivating function; any resource can become part of the educational process, since these elements are one of the central axes of the teaching-learning processes. It is here where the selection, classification and construction of materials in Childhood Education is part of the art of being a teacher of Preschool Education in these educational settings.

In this process there is a clear added value to the communication and that the teacher be consequent to strengthen cognitive and affective development processes of students through codes that are not necessarily linguistic, but that potentiate other edges of the process, as visual literacy, which can be quite enriching during the teaching-learning process.

With these strategies it is hoped to strengthen the communication processes in the classroom, understanding that as long as there is greater clarity and effectiveness between the educator and the students, the messages and information will have more meaning and meaning for both educational actors.

The visual literacy and communication create new forms of communication these learning spaces, allowing to learn through the senses – We understand that we have to be highly curious, ask questions, hypotheses and conclusions that transform what we are seeing, what we observe, what we imagine and, consequently, what we create. The aim is to make visualization a means to achieve and strengthen superior cognitive processes. Together with this, communication creates a new form of interaction between student and teacher, encourages a real dialogic relationship, which through curiosity flourishes a process of questionings and concerns.

The feedback and the accompaniment of the educator make the process bi-directional and extremely enriching. In this sense, the teacher becomes a student's guide. As a whole, it can be concluded that they investigate, discover, invent, and above all solve problems in real situations. That is why the application of this methodology and educational vision, encourages future generations to be able to make disruptive proposals with enterprising goals; without this being an exclusive benefit of the children of metropolitan areas, since the development and the technique are susceptible and necessary in any context, generating wealth and better living standards.

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