

# GET ON BOARD! EDUCATIONAL DESIGN FOR EARLY CHILDHOOD, APPROACHED AS INTERDISCIPLINARY PARTICIPATION.

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## ABSTRACT

Museums continue to be communication centers serving as a channel for different societies to deliver and communicate their cultural traits to future generations. Education, museology and design teams are challenged to develop experiences that facilitate learning, often realizing that the parameters followed to design them do not match users' expectations. Through a process of exploring various sources: exhibitions offered at museums, non-experts expectations, and the participation of designers, the design of educational materials for early childhood was developed to meet the needs of users and aiming to democratize the design process in order to achieve relevant results that respond to the context as well as create and structure a methodology which could be replicated in other centers.

KEYWORDS: *museums, early childhood, interdisciplinarity, light-shadow, experience design.*

## INTRODUCTION

While today the role of museums has expanded to the conscious action of educating, communicating and transmitting information, some of their historic tasks prevail. The museum remains a communication center, serving as a channel for different societies to deliver and communicate their cultural traits to future generations. Therefore, preserving the diverse cultural content, in a cyclic spiral in which knowledge is not only transmitted to the young, but is enriched through the process and creates new knowledge. From the beginning, although sometimes they don't intend to, museums constantly build memories and versions of societies. They appear to convey a past, but what they do is build representations of the past, and those representations always respond to the present they are created in (Jaramillo, 2008).

Although originally museums were not created to consider school visitors, school visits are becoming more frequent, with the aim to enhance or provoke additional study of certain aspects of the children's learning. Given this reality, museums have seen the need to renew and remove their structures to go beyond the custody and collection, to make their exhibitions acquire new meanings for their new audiences.

Museums, zoos and science centers, constitute natural spaces for exploration and informal learning. Free-choice learning experiences are of great importance, considering that on average, formal education covers only 3% of an average person's lifespan (Falk and Dierking, 2002). One of the priorities for informal learning institutions, is to provide experiences that have value in and of themselves, so visitors choose to engage in learning activities because they find them inherently satisfying (Lane, 2014).

According to Altman (1998), visitors rarely stop to read the signs, and for museum, zoo and science center education teams, it is important to ask about the impact of resources displayed, namely, if visitors read the labels that the education team has carefully designed for them and whether the messages are reaching the audience. Staff at zoos, museums and science centers has different perspectives about what visitors want, like or dislike. But the question about whether those ideas are based on reality remains open (Schram, 2011). Very often experienced designers face user' expectations and perceptions which do not always concur with their own.

This article communicates the process of research and design of the educational experience named Get on Board! Design for Museo del Caribe's early childhood education portfolio, in which

the interests and expectations of parents, teachers, artists and professionals from other disciplines were used as input to guide the work of the museums' design and education teams.

## WHY DESIGN FOR EARLY CHILDHOOD AT A MUSEUM?

"Every society, every culture and every era explicitly or implicitly defines childhood, its characteristics and, consequently, the periods of life it includes. Therefore, it is important to understand that our concept of children is socially constructed, arises from our expectations, and children are not children "naturally", but in fact, from a historical perspective, the consideration of children as a different social category, is a very recent creation." (Ancheta, 2008).

In the current Colombian context, since the creation of the Early Childhood Public Policy in 2006, it has been stated that the child is a unique being, with an active and expansive persona, biological, psychological, social and cultural specificity. Born with sophisticated capabilities and quickly developing better tools to think, process and transform the information they receive from their environment and learning very rapidly the relationships existing within the family and in all social environments they live in. Early childhood is a very important stage in the life of every human being, it is a period in which reorganization and permanent transformation of skills are carried out and for that reason, will demand meaningful experiences that foster knowledge about real world, from others and for themselves (MEN, 2009).

As declared by Janette Griffin, "it is vital for museums, to bring young visitors memorable experiences, because this influences their future contracts with cultural opportunities. Good and early experiences determine their own attitudes on participation they will later hold together with their families and friends. And this is what our version of the butterfly effect is about. Translated, this metaphor means: small flapping, meaning, memorable experiences in museums, which perhaps may have great impact on the future life of those who experience them" (Quoted by Alderoqui, 2008).

## METHODOLOGY

We implemented a methodological design which allowed us to discover ideas from the perspective of a small sample of teachers, parents, psychologists, artists, educators and designers (who in their practice, had frequent personal and professional contact with children under 6 years), about the activities and educational materials considered "ideal" for early childhood.

Qualitative research provides more depth and richness of data, given that it is produced by different stakeholders, from different sources, and by using a greater variety of forms of data collection (Sampieri, 2006). This led us to proceed with the active participation of researchers gathering information through:

1. Survey and analysis of organizational documents and materials describing the range of early childhood activities and resources, available in 52 museums.
2. Polling via surveys to 32 non-experts in design (parents, teachers, psychologists and artists who work with infants) on current practices and expectations about the activities and resources available in their context.
3. Review of group artifacts created by non-experts in design for the purpose of this study at the working sessions, in order to establish trends and principles of the expected activities for early childhood.
4. Log the creation process of artifacts, by design experts for the purpose of this study, following the guidelines emerging from the analysis of the sessions with non-expert participants.

It was expected that the analysis of these four sources would allow us to explore the current state of experiences museums offer to an early childhood public and, by these means, to spot trends and potential problems versus expectations of non-experts, to formulate a strategy that subsequently integrates experts and non-experts through a model of co-creation and interdisciplinary work, systematizing the experience and allowing it to be replicated in other contexts and situations.

## CURRENT MUSEUM OFFER

Museums and science centers play an important role in the construction of imaginaries and generating space for meaningful learning; however, just in the last 20 years, new initiatives have emerged in museum design aimed at early childhood, an audience which is particularly diverse and one on which museums and science centers had not focused before.

In the words of Dufresne-Tasse (2008) the museum educators became interested in pre-school children to the extent that educational services diversified their offer to older ones. Following this course, educators developed programs, exhibitions and even museums characterized by maximum use of "interactivity", designed for little children, sometimes looking to entertain through exhibits but, above all, intended to complement the children's psychomotor development or introduce them to the world of art and science.

"Recent experience in several countries shows how the same contemporary museum users (children, youth and adults alike) demand a versatile offer which allows them, through exploring the museum, to be in touch with an inspiring opportunity for knowledge, a possibility to be entertained and a high level leisure experience or in a different order, an experience where you can unleash your creativity from various stimuli" (Orozco, 2005).

However, the following design trends and the specific offer for younger children, often reflect a lack of scrutiny and use

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1 Author's translation

of contextual elements to enhance cultural experiences. It is understood that an educational space is significant when it comes to any situation, activity, task, problem or cultural practice which provides them with the opportunity to learn, reassemble their skills and actually requires them to "think" (MEN, 2009).

Through reviewing the current offer for early childhood, in museums around the world, some trends were quickly spotted. Listed below are the most common:

1. Thinking about children does not always imply early childhood:  
Some museums have a range of activities for children starting at school age (5 or 6 years and older). A typical activity involves themed tours, which require the company of adults, language processing and other features hindering autonomous exploration or not exploiting the interests of younger children by touching, smelling, biting, etc. (Example: thematic tours for children at the Louvre Museum)
2. Stories at the museum:  
There is a trend in museums to associate activities for children with story reading sessions. The advantage of this type of activity is that many museums allow these youngsters (18 months old) to participate in the company of their parents (Example: MET Museum Family Programs).
3. Touch, smell, listen:  
With growing awareness of children's needs, activities have been created that focus on the senses: sight, touch, smell, taste, etc. The advantage of these sensory activities is the variety of opportunities that are presented to the children. The disadvantage is represented by the need to create an alternative space or special exhibits to allow free exploration for children through the various objects and proposed materials (Example: Kids and families MOMA lab).
4. Children tours:  
Many museums often provide accompanied visits for children, which are basically interpretations aiming to bring smaller groups to ask questions about the collection pieces. An advantage they offer is the use of non-complex language and the fact that they allows small groups to view the collections. One of the disadvantages is that these visits are not always available for smaller groups because of the difficulties this represents (Example: Thyssen Bornemisza Dynamic visits).
5. Role-play:  
Role-play is found fairly often and generally a mediator guides participants who are given an assignment. These activities present the advantage of allowing children to enjoy the experience and gain knowledge of a specific topic. On the downside, many of these games can only be played by children over 5 years, or even children who can read or write, which refers back to the idea of "Thinking about children does not always imply early childhood."

(Example: Natural History Museum UK Wildlife garden explorers).



Figure 1. Groups participating on the ideation sessions used diverse materials to create prototypes.

## CALL FOR STAKEHOLDERS: IDEATION AND DESIGN GUIDELINES

The second part of the project was a co-creation. More than any other type of visitor participation, co-creative projects challenge institutional perceptions of ownership and control of content. Co-creative projects require "radical trust" in community members' abilities to perform complex tasks, collaborate with each other, and respect institutional rules and priorities. To execute a successful co-creation project, staff members must not only trust the competencies and motivations of participants but deeply desire their input and leadership (Simon, 2010). Co-creation has proven to be successful in other projects at different Museums, connecting users' needs with staff responsible for developing programs, activities and exhibits in Museums.

After the initial survey of resources available at the museums, we proceeded to make a call to parents, teachers, psychologists and artists in the local community close to the Museo del Caribe. Using a sampling by network through museum visitors' database, a group of 32 participants was assembled. The shared condition was to be in permanent contact with children under 6 years.

The sessions' objective was to explore expectations and imaginaries about the ideal characteristics of activities and resources for children, as well as participants' perceptions about the museum's exhibits for children in this age range. Once the group was selected and their participation confirmed, the session was held, communicating its purpose, and developing exercises to create artifacts.

Through analysis of the session, the prototypes (Figure 2.) designed by participants and the answers to the proposed questions, a draft of guidelines was created to meet the expectations expressed by the participants at the ideation lab. These design guidelines became the foundation for designing educational experiences.

### Design Guidelines:

- **Experiencing stories:** this refers to the need to explore the development of a resource to promote reading processes; it becomes an excuse to enhance storytelling, role-playing around folk tales, and narration of everyday and traditional stories.
- **Playfulness:** the experience should be attractive to children, presented in a way that facilitates exploration, enjoyment, play, and contact with the arts. Less relevant are content and knowledge.
- **Production:** both parents and educators agree on “crafting” as an essential action. Thus, experience should facilitate the production of artifacts and handling of materials like paints, clay, paper, wool, among others, to promote artistic creativity in children.
- **Multisensory:** learning from the use of senses is a priority. Those materials encouraging exploration and using the senses: sight, touch, smells, textures, color, lights are important to develop at this stage of life.
- **Structured Space:** this refers to the interest manifested by both parents and educators to rely on a physical space at the museum, where the educational activities offered to children can take place. This includes the building of an appropriate infrastructure, adequate to meet the specific characteristics of children under 5.
- **Short Activities:** activities are expected to last a maximum of 30 minutes in order to keep children’s attention and motivation.

These guidelines identified the need to facilitate experiences that demand multisensory exploration. Humans are sensory by nature and it is through the senses that learning becomes meaningful. So, as explained by Zapata and Ceballos: “Education in early childhood cannot be based on mechanical, repetitive, meaningless activities that seek only one-way information transmission (from the adult to the boy-girl) with little meaning and motivating. For this reason, the terms initial education or early childhood education comes from a



Figure 2. Prototypes were analyzed to define guidelines. This picture shows a spatial proposal to an activity, which was supposed to use light on glass walls. Participants rated their favorite designs with sticky notes.

broader concept, which aims to overcome the limited vision of education associated with schooling, and seeks to fill with meaning the daily lives of children, contributing to their development as human beings and promoting their free expression and construction of learning” (2010).

### TEAMWORK: EXPERIENCE CO-CREATION

Once consultations and examinations were carried out, the next step was creation. In this phase, graphic and industrial design professionals, psychologists and the Museo del Caribe education team were invited to participate. The aim at this stage was to assemble an interdisciplinary team in order to design the experiences. The experience creation model leads to working across disciplines, but also to work that obeys to different requirements, scenarios and knowledge, with groups that rarely interact with each other in discussions about the design of educational activities.

Guidelines suggested the creation of experiences over merely materials, then, the designers faced the challenge to develop these, with a sense of interaction aesthetics, since not only the materials, but also their use needed to be carefully crafted. The term “interaction aesthetics” to refer to the qualities of a design that lead to the feelings, emotions, and the behaviors that result from these more bodily types of interactions. An important element of these types of interactions is that they happen over time. This is why when we talk about interaction design, and user experience design it is important to not forget that interactions and experiences happen over time (Eden, 2014).

Once again, the co-creation model was followed. Co-creative projects allow cultural institutions to form partnerships that are responsive to the needs and interests of their audiences. Of course, visitors walk into museums with their own needs and interests every day. When staff members are attentive to and interested in accommodating these needs, they can design programs to invite visitors to use the space for their own



Figure 3. Teams focused on different topics and mediation strategies. The group of teachers portrayed here, proposed a room full with objects for children to play their favorite stories.

reasons without entering extensive co-creative partnerships (Simon, 2010).

With guidelines resulting from the analysis in phase, 4 activities were proposed and design teams had the task of creating specific material in order to meet the needs expressed by parents and professionals, framed in the educational philosophy of the Museo del Caribe and adding value to the trends identified in other museums around the world. By translating the guidelines in design and functional prototypes, the next step was taking new material to the production stage. The activities proposed through the call to the design teams were:

1. *Paint your route*: An ephemeral space becomes a field exploration and creation. This activity required the creation of a maze of variable dimensions, which could be assembled inside and outside the museum, allowing children to enter and exit painting the walls with Caribbean colors and the shapes of their imagination.
2. *Animal Enigma*: Caribbean animals are used to ignite a visual exploration of a colorful mural. This experience takes place in a particular space, where light reflected on the wall is controlled, and allows different animals to become visible. The objective of this experience refers to the visual exploration of little children, supported by their parents, while animals appear and disappear in a game of light and colors.
3. *Melquiades' Secrets*: Directly from the confines of Macondo, children receive a visit from Melquiades, a character with a backpack loaded with curious and magical items, for them to look at, touch, smell and feel. A retrieval of the atavist characters of grandfathers and travelers, who come together to share with the little ones and their parents stories of adventure in the nearby Caribbean.
4. *Get on Board! Water, light and color*. Three key elements underpin an experience in which little children approach the tradition of folk stories and legends through a set of magic lanterns and shadows cast on the backdrop and the theater of river, sea and water stories.

## EXPERIENCE DESIGN: GET ON BOARD! CASE STUDY.

In response to the call made by Museo del Caribe, students and professionals from different disciplines attended to design and create educational materials. The Universidad Autónoma del Caribe Graphic Design Program, participated through the research group Ellipsis on the design of the "Get on board!" activity aiming to contribute to appropriation and valuing the Colombian Caribbean's natural and cultural heritage. The research group hosted the project in the Culture Society and began to work on the development of document reviews, interviews, Museo del Caribe visits and teamwork, as well as the developmental stage previous concept design for graphic pieces in order to contextualize the project under the Caribbean historic heritage.

It is important to implement initiatives for early childhood aimed at strengthening their identification with the historical cultural heritage, which we are part of, are defined by and build on a daily basis. From the research group Ellipsis, identity was understood using the theoretical contributions of Jamaican thinker Stuart Hall, which defines culture beyond the functional concepts that conceive it as a set of practices, behaviors, institutions or social processes, to come to place it in the context of meanings and communication. It is established as well that a learning environment needs the design of cultural artifacts. Among these we find: the symbolic frame or context, discursive genre and language use, educational resources, materials and timeframe in which activities are carried out (Zamora, 2000).

The countries' flora and fauna offer an exuberant text, provoking great pleasure (Zamora), along this line of thought, an educational experience in which children could get on board at the Caribbean was designed, through stories set around the most important rivers in the Colombian Caribbean: Cayman Man (Magdalena River), The Hurtado mermaid (Guatapurí River), The golden fish (Cauca River) The Tofeme Corcovado (Rio San Jorge) and Zenú Domicó (Sinu River) all these known through folk stories. This theme was chosen in order to encourage children's Caribbean identity through oral traditions. As declared by Hall (1996), identities are narratively constructed from, first, the stories told by people about who they are and where they come from, based on their historical experience and, on the other hand, the practical use of these stories to build the future.

Moreover, reading is a natural process in the development of human intellectual skills. However, educators must change some mindsets that make them establish the text formed by conventional graphic symbols (letters) as the only one, unaware that the human being, from his early life, is able to interpret signs and different message codes: auditory, body color, movement, light and shadow (Zamora).

One of the challenges faced when designing the educational material, was the search for new ways to sensitize target audiences, because the purpose was to develop funny mi-



Diseño de material educativo para enseñar a la primera infancia  
Historias del Caribe Colombiano entorno al Agua.

Figure 4. Logo designed for the experience Get on Board! Reflecting the purpose to jump into the activities and river stories on the Caribbean.

cro worlds, making learning dynamic by focusing on a type of design which allowed users to exceed the role of passive consumers, as affirmed by Bejarano (1997) "We are part of a culture within which we easily become visual imagery, but not mental devourers." Hence, the interest to offer an experience for thinking, imagining and sensing. "To favor intelligent development means helping to understand the surrounding reality, offer possibilities of play, allow touching, act, test, experiment ... " (Zamora).

The target audience for this experience was children between 0 and 6 years old, characterized for using their senses as channels to understand reality and the world around them. The texts' pluriperception is rich in the first years, then offering a stimuli enriched medium will be fundamental to develop reading skills (perception, interpretation, reflection and response) framed in the world of emotional and symbolic abundance of the early years (Zamora). Thenceforth "Get on board!" became a multisensory experience, which proposes a strategy for image based reading, where light, shape and color become the stars. The experience was designed to give rise to different sensations in the children through dynamic of exploration and creation, implying creativity, imagination and discovery motivating children to think and collectively create stories. This, in turn, stimulates reading capabilities. Infants younger than four months, only perceive images as shadows, they see in black and white, and from this moment on they develop their macula and visual cortex definition. This continues to develop until they are seven years old (Zamora).

In this experience, children have fun recreating a story with the help of light pipes (flashlights) and lenses projecting lights and shadows on a wall, which becomes a canvas where these are cast. Get on Board! Uses light as a design element. It has been proven that the appropriate use of light can lead to a more pleasurable experience (Arefian Atelier, 2011). Every child has access to a tube with a set of interchangeable lenses that can project the icons from the stories created for "Get on board!" These icons are chosen as the story evolves. Each lantern has the following dimensions: body height body and lid: 22.8 cm; flashlight body: 21.4 cm, lens height: 7.7 cm. And every black and white silhouette lens has a diameter: 7 cm.



Figure 5. Light-pipe prototype with some of the first set icons ready to be tried and projected.

The production of lanterns and lenses followed requirements for resistance, safety and usability for kids. This means they were produced using a durable material, which is washable and resistant to water, humidity, smashing and manipulation by children. The materials used include carton and acrylic, which are non-toxic. The final artifact avoids sharp, abrasive or puncture wounds and the size of the lens is big enough to ensure that no airways are obstructed by foreign bodies. No electric charge is required when in use, except a low voltage batteries adaptor, which is not in direct contact with the surface. Finally, it is a proper ergonomic flashlight, well matched to the psychomotor stage for small children, in terms of being maneuverable and lightweight.

Human communication started with images, progressed to pictographs, went to phonetic units and finally to the alphabet. According to Costa (2003), signs and symbols have the ability to evoke absent things, which are not present in the message –but implicitly meant. The icons are conventional figurative representations, which use familiar images easily recognizable. They were widely used in times when people "could not read or write". Young children read icons from an early age (Zamora). The phenomenon (Figure/Ground) captures the idea that in perceiving a visual field, some objects take a prominent role (the figures) while others recede into the background (the ground). The visual field is thus divided into these two basic parts (Soesgaard, 2014).

"Get on board!" encourages children to read signs of the Colombian Caribbean region. Icons representing different characters from the stories are printed on the lenses (for example, the Hurtado mermaid, Cayman Man, etc.) as well as the fauna, flora and objects mentioned in folk stories, and with them the legends proposed by the interpreter are represented.

It is for this reason that the strategy to approach the target audience was through image reading, since in early childhood, children are just beginning to learn written language. Reading competencies are stimulated, not just by typographic acknowledgment, but as mentioned by Bello and Holzwarth (2008), through different literature related activities, for example, when teachers show images, tell stories, asking children to recreate them through images or encouraging them to create their own by questioning the pictures.

## DISCUSSION AND CONCLUSIONS

Using an iterative and co-creative design process allows exhibits to be refined and readjusted. Defining clear goals and objectives, which are connected with curricula and other relevant schemes enables ideas and content to be evaluated and adjustments to be implemented (CAVE, 2010).

Through the proposed methodology, it was possible to obtain relevant information about expectations and perceptions of parents and teachers of children under 6 years, which allowed designers and educators to use adequate strategies to address the audience's needs. Similarly, conducting surveys

on the practices of other museums for the same audience, informed the team about the opportunities and challenges existent in the field.

As a result, a methodology was structured, aiming to integrate the participation of experts and non-expert stakeholders, in the design process of educational resources for early childhood, democratizing the project participation through co-creation process, enriching it with new perspectives from different disciplines, linking content and mediation strategies to context needs and characteristics.

The resulting experience from “Get on board!” will help to ignite reading competencies in children under 6, through experimentation with light, color, shadow and storytelling, in a space of fun multisensory stimuli. It is clear that educational opportunities promoting verbal and non-verbal communication skills cannot be delayed until the beginning of schooling. Linguistic capabilities, when properly stimulated in early childhood, favor more skills to be developed in the future stages. Intelligent reading processes promote world building and reconstruction through play, interaction and human soul gratification.

One of the most important findings for the team, was understanding that for this specific audience, content was irrelevant, otherwise it resulted much more important to prioritize the multi sensorial dimension experience according to perceptive conditions for young children. This finding provided working guidelines to designers. We suggest to incorporate different sources to survey user needs in activities design projects, in order to keep obtaining this kind of insight, which may already be available in literature, but sometimes keeps being ignored by design teams, in their attempt to produce sophisticated experiences. We suggest the replication of this exercise in order to consolidate and adjust the methodology and study additional practices to stimulate interaction of different stakeholders to facilitate future design processes, responding to the challenges presented by users’ expectations and contextual needs reinforcing identity processes in order to achieve meaningful learning in cultural topics.

## REFERENCES

- ALDEROQUI, S (2008) Juventud y museos: el efecto mariposa. Museos, educación y juventud. Memorias del V Encuentro Regional de América Latina y el Caribe sobre Educación y Acción Cultural en Museos CECA - ICOM. Ministerio de Cultura. Bogotá. Consultado el 15 de septiembre de 2012 desde: <http://www.museoscolombianos.gov.co/inbox/files/docs/memoriaeducacionjuventud.pdf>
- AREFIAN ATELIER (2011). Interior light effects on human mood and social behavior. Retrieved en may 1st 2014. <http://www.arefianatelier.com/interior-light-effects-on-human-mood-and-social-behaviour.html>
- ALTMAN, J. D., (1998). Animal Activity and Visitor Learning at the Zoo. *Anthrozoos*, 11(1).
- BEJARANO, G. (1997). *Conceptualización Pedagógica Proyecto Ludomática*. Uniandes-Lidie. Bogotá.
- BELLO, A. HOLZWARZ, M. (2008). *La lectura en el nivel inicial: serie documentos de apoyo para la capacitación / coordinado por Ana Malajovich*. Dirección General de Cultura y Educación de la Provincia de Buenos Aires- 1a ed. - La Plata.
- CAVE, V. (2010). *The New Museum Community: Audiences, Challenges, Benefits*. Chapter: Planning for Young Children and Families in Museums. London
- DONDIS, D. (1978). *Sintaxis de la imagen*. Editorial Gustavo Gili. España.
- DUFRESNE-TASSÉ, C (2008). *Análisis de 50 años de educación museal*. Canadá
- COSTA, J. (2003). *Diseñar para los ojos*, Grupo Editorial Design. Bolivia.
- EDEN, J. (2011). *Interaction Aesthetics versus Visual Aesthetics*. Consulted on April 14th 2014. <http://www.infragistics.com/community/blogs/ux/archive/2010/02/28/interaction-aesthetics-versus-visual-aesthetics.aspx>
- FALK, J.H. and DIERKING, L.D., (2002). *Lessons without Limit: How Free-Choice Learning is Transforming Education*. Walnut Creek, CA: AltaMira Press.
- FRASCARA, J. (2007). *El diseño de comunicación*. Ediciones Infinito. Buenos Aires.
- GEERTZ, C. (1973). *La interpretación de las culturas*. Barcelona: GEDISA.
- GUPTA, A. FERGUSON, J. (2008). Más allá de la “cultura”: espacio, identidad y las políticas de la diferencia. *Antípoda No 7*
- GLAESER E. (2012). *El triunfo de las ciudades: cómo nuestra mejor creación nos hace mas ricos, mas inteligentes, más ecológicos, más sanos y más felices*. Madrid, Taurus.
- HALL, S. (1996). “¿Quién necesita identidad?” En *Cuestiones de identidad cultural*. Stuart Hall & Paul Du Gay. (Comps). Buenos aires, Madrid: Amorrortu editores. Pp: 13-39.
- JARAMILLO M (2008). *Museos, educación y juventud*. Memorias del V Encuentro Regional de América Latina y el Caribe sobre Educación y Acción Cultural en Museos CECA - ICOM. Ministerio de cultura. Bogotá. Consultado el 15 de septiembre de 2012 desde <http://www.museoscolombianos.gov.co/inbox/files/docs/memoriaeducacionjuventud.pdf>
- LANE, C. *Enhancing Informal Learning Experiences with Affect-Aware Technologies*. Institute for Creative Technologies. University of Southern California. retrieved February 9th 2014 from <http://citeserx.ist.psu.edu/viewdoc/download?doi=10.1.1.297.2334&rep=rep1&type=pdf>
- MEN. Ministerio de Educación Nacional (2009) *Desarrollo infantil y competencias en la primera infancia*. Bogotá, Colombia
- OROZCO, G (2005). Los museos interactivos como mediadores pedagógicos. *Revista Sinectica* 26. Guadalajara, México

SCHRAM H. (2011). Looking at people looking at animals. An international bibliography on visitor experience studies and exhibit evaluation in zoos and aquariums. VERSION 0.3. Recuperado en enero 2014 en EAZA <http://www.eaza.net/activities/education/Documents/2011-02-10%20Visitor%20Studies%20Bibliography%20%20Vo.3.pdf>

SIMON, NINA (2010). The Participatory Museum. Museum 2.0. Santa Cruz, California.

SOESGAARD, MADS (2011) Gestalt principles of form perception. Interaction Design Foundation. Consulted on 14th April 2014. [http://www.interaction-design.org/encyclopedia/gestalt\\_principles\\_of\\_form\\_perception.html](http://www.interaction-design.org/encyclopedia/gestalt_principles_of_form_perception.html)

ZAMORA DENIA (2000). Lectura de imágenes en niños y niñas preescolares. Congreso mundial de lectoescritura. Valencia.

ZAPATA, B. E. & Ceballos, L. (2010). Opinión sobre el rol y perfil del educador para la primera infancia. Revista Latinoamericana de Ciencias Sociales, Niñez y Juventud, 8 (2), pp. 1069-1082.