
Architecture, innovative human education and feeling. Inclusive projects for people with disabilities

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Abstract

It is feasible to combine teaching innovation and social inclusion, and transcend the academic sphere. At the CEU-San Pablo University, as part of the subject of «Architectural Composition», educational experiments were carried out based on collaboration between students of Architecture and volunteers with intellectual or visual disabilities. The objective was to devise criteria and spatial typologies to design places of human training. The methodology was interdisciplinary, through working sessions of mixed teams, with empathy characterizing the relationship between students and volunteers; the latter enriched the design sensitivity of the future architects by expressing their way of perceiving, interpreting and feeling educational spaces.

Keywords

Architecture, Disability, Teaching Innovation, Inclusive Education

1. Introduction

1.1. *Essence and environments of human education*

Human education has four essential facets the emotional, the collective, the sustained and the spatial facets. The emotional facet: a good teacher should have a vocational commitment towards the student, combining empathy and communication. The collective facet: it has been scientifically proven that when learning in a group, higher levels of knowledge are attained, as a result of emotional and cerebral interaction; neuro-modulating molecules are released that enhance memory (Guastella, Mitchell, & Mathews, 2008), (Sylwester, 1994). The sustained facet: this characteristic is maintained throughout vital existence, as reflected in the dynamic «Lifelong Learning» (Day, 1999). As a result of the above, human training is a spatial event. If human contact is essential for a qualified education, Architecture will be incorporated, providing artistic values (Romañá, 2004). In other words: Architecture educates (Campos, & Luceño, 2018); and it also becomes a «tacit form of teaching» (Laeng, 1977).

The debate on the importance of Architecture in teaching is of growing interest, with scientific visions (Unzurrunzaga, 1974); or those of the concept of «Spatial Design Education» (Salama, 2015). The current situation suggests that we should see the classroom in an innovative way (De la Torre, 2008), (Frijhoff, 1986). Transcending its conventional space-time limitation, it should be understood as any place that welcomes pedagogical processes: «The classroom thus understood would be any place within the walls of the centre in which the concurrence of professors, teachers and students leads to the coming together of a piece of information, an experience, an observation or a practice» (Blázquez, 1993: 346). Thus, conditions are created for the inclusion of people with intellectual or visual

disabilities; this is the basis for the experiments carried out over 4 academic years at the San Pablo CEU University.

1.2. Regarding the experiential event

Human beings interact with their environment. Perception is the mechanism for internalizing it, receiving impressions through the senses (sight, hearing, touch, smell and taste) (Gibson, 1966). But all the senses are not always present, and those who suffer from blindness must be taken into account.

With hearing, space can be understood (Rasmussen, 1974). Smell and taste contribute less. But touch deserves a more detailed reflection, differentiating between passive and haptic (Ballesteros, 1993). The latter implies using the body («embodied learning») (Skulmowski, & Rey, 2018), or «embodied cognition» (Shapiro, 2014).

Psychological perception and feeling. Perception provides information to function in an environment, but also awakens sensations (a key question to understanding people with disabilities) (Merleau-Ponty, 1993).

When living in a space, people establish perceptual-emotional dialogues; and if they have disabilities, the feelings are more intense. In educational settings, the exchange of ideas is more satisfactory in a psychologically relaxed and safe climate (Entwistle, & Peterson, 2004). For this reason, the study of the sensations awakened by the spaces will provide design stimuli to the architect.

1.3. Disability (intellectual and visual) and inclusion

The experiments carried out as part of the subject «Architectural Composition» combined teaching innovation and human sensitivity, activating the social inclusion of people with disabilities, on whom it is appropriate to present some considerations here.

1.3.1. The human condition and disability

In 2006, the UN International Convention on the Rights of Persons with Disabilities established that every human being has the same rights and freedoms. People with disabilities suffer from perceptual and social integration limitations; but they can develop differential skills. Disability does not refer to the person, but to society; detecting individual talent is essential.

1.3.2. Types of disability (intellectual and visual) and adaptation

There are various documents on intellectual disability: BOE RD 1971/1999, December 23; DSM-5 Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2018).

There are different degrees of intellectual disability: mild, moderate, severe and profound, balancing intellectual quotient, and personal and social skills. In the experiments carried out in the CEU, 17 volunteers from the Juan XXIII Roncalli-FJ23 Foundation participated who suffered from mild intellectual disability, characterized by: difficulties in learning and reading, writing, arithmetic, time or money; disturbances in abstract thinking, impaired executive function and short-term memory; immaturity in social relationships; trouble regulating age-appropriate emotions and behaviours.

Regarding visual impairment, the WHO classifies vision as normal, moderate, severe and blind, considering two aspects: visual acuity (Wecker scale) and visual field.

Seven volunteers from the Spanish National Organization for the Blind (ONCE) participated in the activity. Legally blind persons have visual acuity ten times lower than normal, or their visual field is less than or equal to 10°.

The volunteers who participated required support for adequate functional adaptation. They did not easily understand things, and it was necessary to spend more time on them, avoid technicalities and use well-known examples (Thompson et.al., 2010). Comprehension is not affected in people with visual impairment, but they must reinforce touch and smell.

1.3.3. Cognitive accessibility, environmental psychology and feeling

Sensory perception refers to the mental capacity to assign information to external realities (Hernández, 2005). In those who cannot see, other senses (touch, hearing, smell and taste) are sharpened.

For future architects, it is enriching to know how certain people «look» at buildings through their shapes, textures, smells, or sounds. Architectural design should not be limited to purely visual criteria.

Historical research on psychological perception, (Gestalt) (Oviedo, 2004) should be remembered. Those with intellectual disabilities have the power to detect aspects that go unnoticed by others. By approaching these individuals, architects acquire a special sensitivity that will optimize their creativity, and in their professional

practice they will improve the feelings of those who experience their projects.

In Architecture, perceptions are linked to cognitive accessibility (the ability of spaces to be understood). There are environments in which certain individuals become disoriented, suffering from stress. Cognitive accessibility is usually limited to the use of signposting and signals. But interaction with the environment refers to environmental psychology (Roth, 2000). There are two streams: behaviourism and cognitivism. The former deems that people do not act passively if they lack internal behavioural control (Watson, 1913). The second assesses individuals who actively classify information, and later decide on their behaviour (Neisser, 1967). Regarding feelings, the interaction between person and Architecture gives rise to emotions that influence their internalization. Shape, scale, colour, furniture, lighting, nature, smell, etc., shape behaviour (Arnheim, 1978). Knowing all this helps the architect to design with greater efficiency and sensitivity.

1.3.4. Regarding inclusion

The experiments carried out at the CEU sought innovation in teaching, but with a commitment to the inclusion of people with disabilities. According to UNESCO: «educational inclusion is understood as the process that ensures access, participation and learning for all vulnerable students to be subjects of exclusion, not only those with disabilities or categorized with special educational needs» (Valdés-Morales et.al., 2019: 190). For inclusion to exist, multidisciplinary work teams must be created, formed under equal conditions by people with and without disabilities. In the activities conducted in «Architectural Composition», the teams were comprised of students and external volunteers. Such diversity promoted two-way learning: the volunteers learned about the

architects' way of designing, and the students approached disability with sensitivity and human empathy, which provided them with inspirational guidelines for their future professional practice.

Inclusion breaks down social barriers and reduces discrimination against certain groups. The proposed activities assumed that any human being is endowed with different capacities, and that their contributions can be valuable in creating high-quality projects.

2. Methodology. Disability and inclusive teaching: innovative experiments in the experience of educational environments

2.1. On inclusive teaching and the architect's social mission

The academic innovation activities were carried out during the academic years 2016/2017 to 2019/2020, but this article places emphasis more on aspects of the final year. By integrating 25 architecture students and 17 volunteers (from FJ23 and ONCE), social inclusion was promoted as a dynamic to reinforce learning.

What was achieved enriched the training process of future architects, as it involved an inherent facet of their role: bringing them closer to interaction with the users of their designs, internalizing the notion that the human being should be the centre of their creations. When dealing with people with diverse disabilities, empathy was activated, enabling them to better understand their educational-spatial needs. In a reciprocal sense, the inclusion of these people accentuated social responsibility (Third Mission of the University).

2.2. Experiments in teaching innovation, social inclusion and compositional application

2.2.1. Participants

In the innovation experiments, during the 2019/2020 academic year, 25 students of «Architectural Composition» (4th Year) took part, as along with volunteers with intellectual or visual disabilities: seventeen of the latter were from FJ23 and 7 from ONCE. Forming mixed groups, they carried out a programme of actions, coordinated by the lecturer of the subject and with the support of advisers from both foundations.

2.2.2. Objectives: motivation, empathy and social awareness

In the didactic sphere. -The main goal was to reinforce the students' motivation, in order to improve their skill in architectural composition. The aim was to increase the theoretical background in order to undertake compositional processes: the sensory and psychological perception of forms; spatial poetics and psychagogy; nature and the educational environment; and the phenomenological dimension of the environment.

Based on an innovative philosophy, a combination of sensitivity and cooperation with people with disabilities was fostered. The Teaching / Learning dynamics sought to focus on the student, thus responding to the paradigm shift of the European Higher Education Area (Cifuentes, 2006).

In the sphere of human sensitivity. - The social inclusion of people with intellectual and visual disabilities was promoted, bringing the designer (Architecture student) and the user (external volunteer) closer together.

Exercising empathy between the two as a behavioural instrument was a procedure for understanding that this is an unavoidable part of the social mission of Architecture.

In the sphere of design and universal inclusion. -The objective was for the mixed teams to generate criteria and urban planning-architectural typologies that would optimize the future design of inclusive training spaces. Acting as a projective stimulus, the volunteers with intellectual or visual disabilities learned and internalized ways of perceiving the environments (sensory, psychological and sentimental). The teams discussed aspects such as: natural light, colour, texture, urban furniture, human scale, or the didactic role of nature. Considered in this way, inclusion was added to the objective of compositional teaching, channelled through an intense human sensitivity.

2.2.3. Methodologies and sites of the experiments

The innovation that characterized the experiments was based on the fact that the aforementioned genesis of criteria and typologies would be the result of personal and inclusive interaction between students and volunteers. The methodology sought to bring together three vectors: architectural research, experience of places of education (incorporated perception), and soundings (dialogues), both human and spatial.

First, students investigated projects designed by contemporary teachers that combined education and human scale, weighing up the perceptual implications that influence composition. Secondly, the memory of places dedicated to human training, as they stimulate emotions (Morgado, 2012). Remembering awakens evocations that end in the phenomenological dimension of space, as a stimulus for creativity (Pallasmaa, 2005).



Image 1. *Work with models. Tactile perception of the representation of Architecture (source: Authors).*

The third (and essential) vector was to activate human sounding boards, through collaboration between students and volunteers. People with disabilities contributed their perceptions and feelings about generic spaces, and made suggestions on how to optimize the design of educational spaces. Operationally, the methodology included the following activities, displayed chronologically:

- a. Statement of the work, delivered to the students of «Architectural Composition» at the beginning of the academic year.
- b. Presentation to the 25 students of the 23 people with intellectual or visual disabilities, with lectures on their way of perceiving and feeling.
- c. Training of mixed teams (CEU students-volunteers from FJ23 and ONCE) and inclusive work sessions. During the sessions, habitual means of representation in Architecture were used: sketches, photographs and models (the latter proving very useful for volunteers with visual disabilities). (Image 1).

The students engaged in practical training wearing ONCE masks, touring the EPS building in order to feel like sightless people.

- d. Research of educational projects carried out by contemporary teachers, and lectures on compositional typologies and poetics of spaces (classrooms, buildings, campuses)
- e. Final preparation and presentation of the teams' work (spatial criteria and typologies), and dissemination in the media.

3. Results

3.1.-Educational results in architecture students

The architects' training was optimized guiding them in the transition from perceptual reflection to project praxis. Collaborating with people with disabilities, their creativity was increased, as they approached design with greater sensitivity. Transcending the usual pedagogical formats and opening up to empathic interaction with external volunteers benefits their process of maturation as future professionals. The activity led them to internalize the sensory, psychological and emotional perception of those with intellectual or visual disabilities - to reinforce the «feeling» of space, as a philosophy of project design.

The results linked to the improvement of their training as architects were the following: the strengthening of repeated empathy, very useful in innovation strategies (Reus, and Blancafort, 2017), raising awareness with vulnerable groups that Architecture must take into account; conducting solid research work (analysing teaching buildings by contemporary architecture teachers).

Finally, criteria were generated for future educational projects, on topics such as: compositional models, nature, or human scale.

3.2.-Results in inclusion of people with disabilities

The experiments were beneficial for the volunteers with intellectual or visual disabilities, notably in terms of an increase in their social inclusion. They also learned about architecture, in general, and educational spaces, in particular: strategies for the conceptual design of a building, models, coloured textures, or integration with the environment. Another valuable result of the work



Image 2. Work session of mixed teams. Architecture students - volunteers with intellectual disabilities (source: Authors).

was that the external volunteers felt useful, realising that they possessed sensitivities capable of inspiring the design of educational spaces. (Image 2)

3.3.-Contributions of people with disabilities to the composition of educational spaces

The inclusive work sessions between students and volunteers produced a set of criteria and spatial typologies for the optimization of the composition of educational environments. These contributions are summarized according to three central themes:

a. Regarding functional adaptation to the environment

People with intellectual or visual disabilities showed their interest in observance of the regulations on accessibility, both in technical matters (architectural and urban), as well as with regard to educational complexes. In this latter area, there are relevant publications: the one sponsored by CERMI (Aragall, 2010), or the work «Universal accessibility and design for all.» (ONCE Foundation, 2011).

People with intellectual disabilities. -Criteria provided.

- *An educational centre must be easily accessible from the city; and have a flat entrance or ramp, for people with mobility problems*
- *Pictograms have to be added to find places of interest*
- *Evacuation must be guaranteed in case of fire or alarm*

People with visual disabilities. -Criteria provided.

- *The teaching complex must be integrated into the environment, so that there is continuity in accessibility*
 - *Signs must be in braille, and not be too high up*
 - *Furniture with sharp corners should be avoided, as it can cause harm, especially in classrooms*
 - *The handrails must be continuous, and there should be landings on the stairs*
 - *Experimental or educational gardens should have raised cultivation tables, accessible to the touch*
 - *There must be open spaces, free of obstacles (fixed or furniture)*
 - *Colour changes facilitate orientation*
- b. *On cognitive accessibility: perception of space and incorporated cognition*

Contributions on «person-environment» interaction are included.

People with intellectual disabilities. -Criteria provided.

- *In order to understand the educational centre spatially, the smaller scale must be prioritized: micro spaces create a sense of welcoming and focus attention on specific pedagogical issues*
- *Architecture must be integrated into nature, so as to enjoy the natural environment*
- *Training spaces must be identified by a name which corresponds to their function, to make them easier to memorize*

- *Single-height buildings are preferable, since they avoid level changes (stairs or ramps), and favour a three-dimensional understanding*
- *Changes in scale should be progressive, avoiding lobbies of excessive size and height*
- *Furniture must be cared for, as it directly affects people's movement decisions, and their orientation in space*

People with visual disabilities. -Criteria provided.

- *Walking makes it easier to get to know the educational space*
- *Install tactile paving when there are changes in height*
- *The doors must have a different colour to the wall, creating contrast (around 70%); but avoid using too many colours, as this leads to visual confusion*
- *Use textural contrasts (perceptible when walking or touching with the hand); they help with orienting oneself*
- *Use warning surfaces, which anticipate stairs or other singular elements, making them detectable by people with vision problems*
- *Corners help to understand the teaching spaces, and slight changes of direction*
- *Integrating teaching furniture into architectural design reinforces the understanding of it as a unitary reality*

- *Pay attention to the type and arrangement of the lights, avoiding the creation of shadows that are spatially disorienting*
 - *In the training content exhibition areas, three-dimensional objects and audio guides should be prioritized*
 - *Include botanical garden areas, as in addition to their perceptual appeal, they add a didactic dimension; pleasant smells serve as enjoyment and guidance (plants or flowers)*
 - *Incorporating acoustic emissions (sounds, melodies, etc.) helps with orientation in the educational centre*
- c. *On environmental psychology: the feeling of space*

Volunteer input on how educational places feel.

People with intellectual disabilities. -Criteria provided.

- *The student is more motivated in an environment conducive to learning*
- *The architecture of a teaching complex must be an organization of people, not just buildings.*
- *Things virtual should not be abused in pedagogy*
- *It is preferable to adapt the building to nature, to make one feel that it is more transcendent than artificial things*
- *Open the enclosures to the community (even with squares in the urban environment), since they generate social and family interaction*

- *Fluid spaces awaken wellbeing and a sense of human closeness*
- *Water relaxes, visually and acoustically (even more so if it is in motion)*
- *If lateral (not frontal) views are contemplated, the person feels that they control the perception of the teaching building, and not the other way around*
- *Install light doors, so as not to create a feeling of difficult access*
- *Sporting uses stimulate a playful feeling*
- *The limits of educational spaces must be clear, as they avoid uneasiness; can be streams or trails*
- *Educational places must have a clear inner core, as this focuses attention*
- *Spaces with natural light, light colours and views of the outside generate mental wellbeing*
- *The use of «call elements» such as sculptures, paintings, etc., foster interest in discovering*
- *Corridors should be wide, bright, short, with an end that can be clearly understood (builds confidence)*
- *The furniture (type and distribution) can create positive sensations*
- *There must be thermal comfort, as this creates psychological wellbeing*

People with visual disabilities. -Criteria provided.

- *Install milestones (not visual) to establish educational spaces; if they are too wide, they are difficult to use*
- *Symmetrical urban-architectural compositions are easier to use and memorize*
- *Nature enriches, as it acts as a pleasant sensory stimulus*
- *Open-plan educational spaces, without architectural or furniture obstacles, induce tranquillity*
- *Natural light is beneficial, but should not be too intense (causes discomfort in those with residual vision)*
- *The distribution patterns should be simple (rows of classrooms, corridors, hallways, etc.), but with three-dimensional pauses that help to assimilate the space (perhaps using small steps on the floor)*
- *Natural ventilation generates wellbeing (air quality), but also a pleasant perception of space*
- *Sensory tours awaken positive feelings and safety when travelling, and provide educational potential*
- *Water in educational settings (in fountains or water features) brings serenity and calm, being perceived with touch and hearing*
- *Certain materials have perceptual-psychological connotations: grass (softness, freshness); sand (associated with playfulness); outdoor concrete (solidity and smoothness); wood in vertical planes (warmth and nurturing), on horizontal planes (nurturing and evocation of the home)*

- *The composition of the teaching building should be simple, as this facilitates cognition, awakening feelings of mental wellbeing*

4. Discussion and conclusions and future projection

Innovating in universities today is an unavoidable obligation, which involves reviewing strategies and spaces (De la Torre, 2008). In contrast to the statism suffered for decades, innovation emerges with undeniable force: «To open paths to the metamorphosis of humanity we need to reinvent education» (Morin, & Delgado, 2014: 11). That students learn does not only affect teaching techniques: it requires a human commitment to the teaching vocation, which implies creativity, interaction and human sensitivity.

The innovative experiences in the training of architecture students described in this text were tinged with empathy, by activating direct contact with volunteers with intellectual or visual disabilities. An empathy that had human touch as its ally. Although it is enriching to incorporate information and communication technologies (ICTs), this must be done reasonably. Introducing them as subordinate tools, they can be useful for activating previously inert places. But the abuse of ICTs threatens the humanistic dimension of learning. In academic matters, the experiences enriched the students' training, by promoting inclusion, (this increases their sensitivity to the social mission of Architecture).

After compiling the spatial criteria and typologies expressed by the volunteers, certain conclusions can be summarized. Their interest lies in the fact that, transcending the interest in designing educational spaces for people with disabilities (intellectual or visual), they are

relevant for any user. This may have been the lesson with the greatest impact.

On functional adaptation to the environment. The volunteers attached importance to observance of the existing regulations on accessibility. They added that functional adaptation is not limited to the educational complex: it must begin in the city, in order to create accessibility and mobility channels prior to entry.

On cognitive accessibility. The preference for spaces on a human scale was striking, as they generate feelings of wellbeing and slow down the experience. Walking and pausing facilitate cognition in people with disabilities, promoting physical and psychological wellbeing; This argument once gave rise to wonderful contributions, both poetic and philosophical (Rousseau, 1986), (Schelle, 2013). Thus, embodied learning relies on bodily feeling. Regarding orientation, the participants expressed the idea that the identification of training spaces is reinforced if there is a connection between their content and the name.

On environmental psychology: feeling of space. One thought-provoking contribution was that the way of feeling space was essential for positive experience of educational places. The volunteers stated that they prefer to have safe environments, which mitigate their limitations and reduce their insecurity. (Rodríguez, García, and Rubia-Avi, 2017). The following ideas were expressed in order to awaken pleasant emotions;: opening the educational complexes to the social and family environment; using geometrically simple compositional patterns (providing orientation and tranquillity); integrating natural light and openings to panoramic domains; and the psychological benefit of an adequate colour combination (Heller, 2004). The observations on the limits were subtle, with a preference for those that combine constructive subtlety with a certain sensory clarity



Image 3. *Teaching innovation, architecture and human sensitivity (source: Authors).*

(visual, tactile or sound). On interior areas, they appreciated the existence of a heart or nucleus, since this concentrates attention and aids the hierarchical understanding of space, and the feeling of stability. The most important recommendation for the design of educational spaces was that Architecture must be an organization of people, not only of constructed shapes; this places feelings at the heart of the project event.

Some final considerations can be noted.

People who suffer from «bodily» disabilities (intellectual or visual) do not have their sensitivity impaired, and are able to provide valid compositional criteria for teaching groups. Working «for» and - above all - «with» people with disabilities provides enormous human and creative wealth. Regarding future projection, the experiments carried out can be optimized and extrapolated; their international replicability has been recommended (Università degli Studi di Cagliari, Zhejiang University, and University of Lisbon).

We could mention a final humanistic conviction. In the experiments conducted, the volunteers showed a proactive, even enthusiastic attitude. Their relationship with the architecture students reached a high level of complicity, and they came to feel that they were part of the teaching innovation. What was achieved transcended the pedagogical level. People with intellectual or visual disabilities contributed feelings to the training event: the experiments transformed the School of Architecture, and the people who participated (students and teachers), crystallizing an experience charged with affection, hope and magic. (Image 3)

Bibliographic references

- American Psychiatric Association (2018). *DSM-5 Manual Diagnóstico y Estadístico de los Trastornos Mentales*. Washington, D.C.: American Psychiatric Publishing.
- Aragall, F. (2013). *La accesibilidad en los centros educativos*. Ediciones Cinca.
- Arnheim, R. (1978). *La forma visual de la arquitectura*. Barcelona: Gustavo Gili.
- Avi, M. R., Navarro, H. R., & Monge, A. G. (2017). Análisis de las interacciones en entornos comunicativos de aprendizaje. Estudio de un grupo de escolares 4º curso de Educación Primaria. *Revista de Educación Inclusiva*, 10(1), 161-180.
- Ballesteros, S. (1993). Percepción háptica de objetos y patrones realzados: una revisión. *Psicothema*, 5(2), 311-321.
- Blay, T. R. (2004). Arquitectura y educación: perspectivas y dimensiones. *Revista Española de Pedagogía*. Vol. 62, No. 228 (mayo-agosto 2004), pp. 199-220.
- Campos, P., & Luceño, L. (2018). *Las formas de la educación. Vínculos entre dimensión docente y dimensión arquitectónica en disciplinas creativas, como expresión de innovación universitaria*. Universidad Carlos III de Madrid-Instituto Figuerola de Historia y Ciencias Sociales, Madrid, Editorial Dykinson, pp.1-168.
- Cifuentes, P. (2006). El profesor universitario ante el EEES. *Revista galego-portuguesa de Psicoloxía e Educació*, 13, pp. 43-57.
- Day, C. (1999). *Developing teachers: the challenges of lifelong learning*. Londres, Falmer Press.

De la Torre, S. (dir) (2008). Modelo Multidimensional de Análisis de Estrategias Didácticas. *Estrategias didácticas en el aula. Buscando la calidad y la innovación*. Madrid, UNED, pp.89-114.

Entonado, F. B. (1993). El espacio y el tiempo en los centros educativos. *Organización escolar: Una perspectiva ecológica* (pp. 339-366). Editorial Marfil.

Entwistle, N. J., & Peterson, E. R. (2004). Conceptions of learning and knowledge in higher education: Relationships with study behaviour and influences of learning environments. *International journal of educational research*, 41(6), 407-428.

Frijhoff, W. (1986). La universidad como espacio de mediación cultural. *Historia de la Educación Revista interuniversitaria*, pp. 41-60.

Fundación ONCE (2011), *Accesibilidad universal y diseño para todos. Arquitectura y Urbanismo*. Madrid, ea! Ediciones Arquitectura-Fundación Arquitectura COAM.

Gibson, J. J. (1966). *The senses considered as perceptual systems*. Boston, Houghton Mifflin.

Gilberto, O. (2004). La definición del concepto de percepción en psicología con base en la teoría Gestalt. *Revista de estudios sociales* (18), 89-96.

Guastella, A. J., Mitchell, P. B., & Mathews, F. (2008). Oxytocin enhances the encoding of positive social memories in humans. *Biological psychiatry* 64(3), 256-258.

Hernández, E. (2005). *Evaluación sensorial*. Bogotá, DC. Universidad Nacional Abierta y a Distancia.

Heller, E., & Mielke, J. C. (2004). *Psicología del color: cómo actúan los colores sobre los sentimientos y la razón*. Barcelona: Gustavo Gili.

Laeng, M. (1977). *Esquemas de pedagogía*. Barcelona: Herder.

Merleau-Ponty, M. (1985). *Fenomenología de la percepción*. Barcelona: Planeta Agostini. Versión original *Phénoménologie de la perception* (1945), París, Éditions Gallimard.

Morales, R. A. V., López, V., & Vargas, F. J. (2019). Inclusión educativa en relación con la cultura y la convivencia escolar. *Educación y educadores* 22(2), 187-211.

Morgado, I. (2012). *Cómo percibimos el mundo: una exploración desde la mente y los sentidos*. Barcelona, Ariel.

Morin, E., & Delgado, C. (2014). *Reinventar la educación. Hacia una metamorfosis de la humanidad*. Multiversidad mundo real Edgar Morin

Neisser, U. (1967). *Cognitive psychology*. Englewood Cliffs, NJ: Prentice-Hall.

Pallasmaa, J. (2005). *The eyes of the skin: Architecture and the senses*. Chichester West Sussex: John Wiley&Sons.

Rasmussen, S. (1974), *Experiencia de la Arquitectura*. Barcelona: Editorial Labor, Versión original: *Experiencing Architecture*. Cambridge, MA, MIT Press, 1959.

Reus, P., & Blancafort, J. (2017). Empatía, colaboración y dosis de realidad en la enseñanza del proyecto arquitectónico. En *García-Escudero, D., & Bardí, B.*

- (eds.) *V Jornadas sobre innovación docente en Arquitectura*. Barcelona: Iniciativa Digital Politècnica Oficina de Publicacions Acadèmiques Digitals de la UPC, pp.339-351.
- Rousseau, J.J. (2016). *Las ensoñaciones del paseante solitario*. Madrid: Cátedra. Versión original: *Les Rêveries du promeneur solitaire*, 1782.
- Roth, E. (2000). Psicología ambiental: interfase entre conducta y naturaleza. *Revista ciencia y cultura* (8), 63-78.
- Salama, A. M. (2016). *Spatial design education: New directions for pedagogy in architecture and beyond*. New York: Routledge.
- Schelle, K.G (2013). *El Arte de pasear*. In López Silvestre, F. *El mundo a tres kilómetros por hora*. Madrid: Díaz&Pons Editores. Versión original: *Die Spatziergänge oder die Kunst spazierenzugehen*, 1802, Leipzig.
- Shapiro, L. (ed.) (2014). *The Routledge Handbook of Embodied cognition*. Londres: Routledge.
- Skulmowski, A., & Rey, G. D. (2018). Embodied learning: introducing a taxonomy based on bodily engagement and task integration. *Cognitive research: principles and implications* 3(1), 6.
- Sylwester, R. (1994). How emotions affect learning. *Educational leadership* 52(2), 60-65.
- Thompson, J., Bradley, V. J., Buntinx, W., Schalock, R. L., Shogren, K. A., Snell, M., & Gomez, S. (2010). Conceptualizando los apoyos y las necesidades de apoyo de personas con discapacidad intelectual. *Siglo Cero*, 41(1), 7-22.

Unzurrunzaga, M. T. (1974). Consecuencias arquitectónicas de las nuevas tendencias pedagógicas. *Revista de Educación* (223-224), 34-53.

Watson, J. (1913). Psychology as the behaviorist views it. *Psychological Review*, 20, pp. 158-177.

