

Intermodal coherence in audio descriptive guided tours for art museums

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Abstract

The aim of this article is to propose a method for designing audio descriptive guided tours with tactile exploration in art museums. It draws on existing guidelines as well as on descriptive and theoretical studies of this intersemiotic translation modality, and is illustrated with materials designed for the *Describing Sorolla* tour held at the Sorolla Museum by Kaleidoscope, an organization dedicated to fostering universal access to culture. In order to give a detailed description of the method proposed, a semantic analysis of the audio description of one of the paintings selected for the visit is carried out. The results from this analysis are in turn discussed in relation to the tactile image used during the tour and the verbal instructions given for its exploration to provide a better understanding of intermodal coherence as an essential element of the method proposed to build this type of multimodal discourse.

Keywords

Intersemiotic translation, audio description, tactile image, art museums



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1. Museums, accessibility and multimodality

Following the principles of New Museology (Marstine, 2006; Hooper Greenhill, 2007), museums around the world are increasingly aware of the need to implement resources that allow visitors with different capabilities to access their collections, transforming the museum into an inclusive learning experience (Soler Gallego, 2012). Nowadays, two accessibility resources are used to improve visually impaired visitors' access to the museum experience: verbal description and tactile exploration. Verbal description (VD) can be considered a modality of intersemiotic translation (Jakobson, 1959; Gottlieb, 2005) from images into words that aims at helping people with a visual impairment to build a mental image of what they cannot see (Salzhauer Axel & Sobol Levent, 2003, p. 229). Regarding the medium used, VD can be printed in big fonts or Braille, or conveyed orally through the acoustic channel. The latter is termed audio description (AD), and it is divided into two categories: live AD and recorded AD. The former is used during an audio descriptive guided tour of the museum or exhibition, and the latter can be either used to compose an audio descriptive guide or embedded into multisensory resources like the talking tactile pen and the talking tactile exhibit panel developed by Touch Graphics.

At museums, AD is often combined with a tactile exploration of the original exhibit, scale models or tactile images. This semiotic complementarity of the verbal-auditory mode and the tactile mode (and the visual, for those visitors with low vision) gives rise to a multimodal experience that allows visually impaired people to access both the knowledge contained in an exhibit and the sensations it provokes. These resources can be enriched with other acoustic information and effects such as prosody, music and sounds related to the exhibit (Neves, 2012, p. 290), as well as with olfactory information. In recent years, accessibility in Spanish museums has developed considerably, thanks to international, European and national legislation on accessibility, and to the joint efforts of museum professionals, companies (Access Friendly, GVAM, Aptent, Aristia, Touch Graphics, to mention a few), and organisations (CESyA, ONCE).

2. Museum accessibility for visually impaired visitors in Spain

In the past decade, the number of Spanish museums that use AD as an accessibility resource has increased. A list of museums that currently offer audio descriptive guided tours and audio descriptive guides to their visitors is displayed in Table 1. This evolution stems from recent advances in international, European and national legislation on universal accessibility. In 2006 the Convention on the Rights of Persons with Disabilities was adopted by the United Nations, and took effect in Europe and Spain in 2008. According to Article 9, "States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas" (UN General Assembly, 2006). These measures include the development, approval and monitoring of a set of accessibility guidelines.

To comply with the Convention, a law was passed in Spain that required the Government to approve a document of basic accessibility requirements within a period of two years (Spain, 2011). The Integral Spanish Strategy on Disability 2012-2020 and the Spanish Strategy on Culture for All were subsequently approved. The latter includes specific goals and actions aimed at ensuring cultural access for people with disabilities. The first goal is to integrate previous actions carried out by the Ministry of Culture into an accessibility plan. This plan

includes the development of accessible multimedia guides for museums designed in accordance with the principles of universal accessibility, as well as guided tours for visually and mentally impaired visitors, and tactile itineraries. The second goal is to create a set of standards for the development of these resources. In order to fulfil this objective, two documents on the access to culture for hearing impaired people (Ferreiro, 2013) and visually impaired people (Bonmatí & Espinosa, 2014) were published.

Resource	Museum
Audio descriptive guided tour	Guggenheim MNCARS Museo Thyssen-Bornemisza Museo Sorolla Museu d'Art Contemporani de Barcelona Fundació Joan Miró Museo Picasso (Barcelona) Museo Picasso (Málaga) Museo Carmen-Thyssen Colección CajaGRANADA Patronato de la Alhambra: Exposiciones temporales
Audio descriptive guide	Guggenheim Museo de Bellas Artes (Bilbao) MNCARS Museo del Prado Museo del Romanticismo Museo Lázaro Galdiano Museo Sorolla Museo Carmen-Thyssen Museo Arqueológico Nacional Museo Julio Romero de Torres Museo Nacional de Altamira Museo Sefardí Museo Nacional de Arte Romano Museo de la Evolución Humana Museo de la Naturaleza y el Hombre

Table 1. Spanish museums offering AD resources.

As observed in Table 1, some museums in Spain favour the audio descriptive guide as an accessibility resource for visually impaired visitors. However, these guides are in some cases underused, as potential users are not always aware of their existence and the museum staff may have little experience in dealing with this type of resource and visitor. This situation can be tackled by complementing the audio descriptive guide with audio descriptive guided tours, where visitors get to know the museum during a group activity that prepares them for future autonomous visits. The aim of this article is to propose a method for designing audio descriptive guided tours with tactile exploration in art museums, which draws on Braun's method for AD production (2011), existing guidelines, and professional practices identified in a previous corpus-based descriptive study of AD in art museums (Soler Gallego, 2016, in press).

3. The audio descriptive guided tour as a multimodal discourse

The audio descriptive guided tour consists of a visit to the museum's galleries during which a detailed and vivid description of a collection of exhibits as well as the physical environment where they are located is given to visitors. Some examples of this type of resource are the *Describing Sorolla*, *Describing Guerrero* and *Describing Picasso* visits within the *Words to See* program. This program has been carried out since 2014 by the Kaleidoscope organization (www.kaleidoscope-access.org), of which I am a co-founder, in collaboration with the Sorolla Museum, the Colección CajaGRANADA museum and the National organization of the blind in Spain (ONCE). It follows similar initiatives by the Thyssen-Bornemisza and MNCARS museums, and the Access Friendly company (www.accessfriendly.es).

During the audio descriptive guided tours of the *Words to See* program, the museum architecture, the exhibition design, and a selection of artworks are described. This description is complemented with contextual information and tactile images that are created using different materials and techniques (thermoforming, fuser, and ethylene-vinyl acetate or EVA). The tactile images are explored by visitors following instructions given by the guide. During the tour, visitors are invited to participate by sharing their own descriptions, interpretations and sensations within the group. Sometimes, the tour is followed by an art workshop during which visitors can express themselves through different materials and techniques related with the audio described works and especially adequate for visually impaired people (textured paint, modelling, embossing, etc.). A variety of this activity aimed at fostering universal accessibility at the museum is also carried out within the program. In this case, the activity is open to visitors with a visual impairment, with an auditory impairment, and with no disability at all. The ADs and other verbal-auditory information are interpreted in sign language. The aim of this tour is to create a space for cooperative learning, where every visitor benefits from multisensory techniques that were originally intended for people with visual disabilities.

The preparation of the audio descriptive guided tour follows a method based on Emancipatory Disability Research (Barnes, 2003; Oliver, 1992). This theory-methodology claims the active participation of people with disabilities in the research process and emphasizes the great value of their expert opinions, derived from their personal experience (Hollins, 2010, p. 228). Visually impaired consultants participate in the evaluation of the audio descriptive and tactile materials developed for the visit before they are implemented. Besides, after every visit participants are asked to share their opinions on the quality and adequacy of the materials.

Preparing the tour begins with the selection of the artworks with the help of the museum staff (the curators and educators). On average, we select two to four pieces per tour based on the overall theme of the tour, and typically we dedicate around twenty minutes to each work. The first stage of the AD process is the analysis of the artwork and its context. The most relevant components are then selected to create the script, and a tactile image is designed. The tactile image, as an intersemiotic translation of a visual text into a tactile representation, also requires a selection of the most relevant content of the original image. Finally, a set of verbal instructions for exploring the tactile image are put together. These instructions constitute a bridge between the AD (and the artwork), and the tactile image. To explain the method proposed to create audio descriptive guided tours with tactile exploration and illustrate how these three elements relate to each other in the construction of a multimodal discourse, I have selected one of the paintings that I audio describe during the tour at the Sorolla Museum entitled *Trata de blancas* (see Figure 1). This tour is done together with M. Olalla Luque Colmenero and Gala Rodríguez Posadas, audio describers and co-founders of Kaleidoscope.



Figure 1. Joaquín Sorolla Bastida, *Trata de blancas*, 1894. Oil on canvas. Museo Sorolla (inv. no. 00320).

4. Words to see: From visual interpretation to verbal reformulation

One of the main characteristics of AD is the need to translate simultaneously presented visual signs into a sequential verbal discourse, and this raises various questions for the audio describer, namely what to describe, the order in which to present the selected content, and how to link the visual elements in the verbal description (Braun, 2011, p. 658). Because the audio describer can focus on different components of the visual artwork, it is principal that different theories of visual communication be considered to guide the selection. Among the different theories of visual communication is Dondis' (2006) proposal, which draws from an approach to visual perception within Gestalt psychology and offers a categorization and explanation of the different components of visual data. Her aim is to promote visual literacy among both creators and receivers at a time when non-verbal images are increasingly used by humans to convey meaning.

According to Dondis (2006, p. 33), the composition of a visual message is the orchestration of the basic visual elements following specific techniques. These elements are the raw material of visual communication, and Dondis lists the following: dot, line, shape, direction, tone, colour, texture, dimension, scale, and movement. The two main techniques of visual communication are contrast and harmony, from which derive several sub-techniques expressed as opposites: horizontality–verticality, balance–imbalance, sequential–aleatory, and so on. These techniques are based on theories of human visual perception, such as the preference for the bottom left corner, or the sense of imbalance provoked by divergences from the vertical and horizontal axes (pp. 35 ff.).

In her theory, Dondis identifies three levels of visual data: symbol systems, representational visual material, and the abstract understructure (2006, p. 13). The abstract understructure consists of the basic visual elements, the composition and the medium, which are the formal components of the visual message. The content or meaning of this message consists of the iconic signs (those that represent our environment) and symbolic signs (those to which humans have arbitrarily assigned meaning), as well as of the concepts, sensations and

emotions that the signs and the formal components evoked and triggered in the receiver (Dondis, 2006, p. 15). For the purpose of this study, I have termed these concepts, sensations and emotions as “opinion”.

In a previous corpus-based descriptive study of visual art AD, I carried out a semantic analysis of audio descriptive guides in art museums (Soler Gallego, in press). First, the verbs and their participants, i.e. the concepts that fit into the schematic structure activated by the verbs (Radden & Dirven, 2007, p. 269), were analysed and classified. The classification of verbs followed the methodology of lexicographic definitions analysis (Faber & Mairal, 1999), which was combined with the analysis of the verbs' co-text in the AD (Faber, 2012). I then classified the verbal participants into a taxonomy of the components of visual communication based on theories of art and design (Dondis, 2006; Fichner-Rathus, 2011), which is shown in Table 2 (categories used for the analysis in italics). Finally, both the verbs and their participants were interpreted conjointly.

Visual communication	Content	<i>icon</i>	
		<i>symbol</i>	
		<i>opinion</i>	
	Formal components	<i>technique</i>	
		<i>material</i>	
		<i>style</i>	
		<i>composition</i>	
		Visual elements	<i>dot</i>
			<i>line</i>
			<i>shape</i>
			<i>space</i>
			<i>dimension</i>
			<i>movement</i>
			<i>direction</i>
			<i>texture</i>
			<i>tone</i>
			<i>colour</i>

Table 2. Taxonomy of the components of visual communication

The formal components are defined as follows (see Appendix 1 for examples from a corpus of audio descriptive guides in art museums):

Technique: methods used to manipulate and create with the materials.

Material: physical elements used to create the artwork.

Composition: orchestration of the basic elements of visual communication with a specific communicative and expressive purpose.

Style: synthesis of medium (material and technique), composition and purpose.

Visual elements:

Dot: a place without area.

Line: a succession of adjacent dots.

Shape: a differentiated two- or three-dimensional area.

Space: the three-dimensional space of the real world and the implicit space created by visual techniques to simulate depth in two-dimensional media.

Dimension: size, scale and proportion of the visual elements.

Movement: the actual movement of entities in the real world and in a video recording, the implicit movement (it is inferred from the image that its elements moved), and the illusory movement (the image triggers the sensation that its elements are moving).

Direction: the direction of a movement or a shape.

Texture: perceptible structure made of lines or objects.

Tone: shades of grey, contrast (luminosity) and value pattern (variation and disposition of light and darkness).

Colour: visual perception of the different wavelengths.

The semantic analysis is illustrated here with the following excerpt from the AD of *Trata de blancas*: “Pegado a esta pared hay un segundo banco en el que dos muchachas duermen sentadas, con la cabeza caída hacia delante y ligeramente ladeada” (Alongside this wall there is a second bench where two girls are sleeping in a seated position, with their heads down and slightly tilted to the side). The analysis begins with the analysis of the verb “hay” (there is/there are). I define it as “existing or being present” based on the definitions found in various monolingual dictionaries and its specific meaning in the text, and classify it under the lexical domain of EXISTENCE. In this sentence, the verb “hay” has two participants: “pegado a la pared” (alongside this wall) and “un segundo banco” (a second bench). I classify the latter as ICON, since it refers to a component of the artwork that resembles and can be recognized as an element of the real world. The former is classified as COMPOSITION, since it indicates the location of the iconic sign within the two-dimensional space of the painting. The analysis continues with the classification of the second verb in the sentence (“duermen”) and its participants, and so on and so forth.

In a previous corpus-based study of audio descriptive guides of art museums, three levels of semantic specificity were identified: the translation of the work as a whole (Level 1), the translation of the content and formal components it is made of (Level 2), and the translation of the specific properties of the elements described in the previous level (Level 3). These results help to describe current professional practices in AD for art museums and coincide with the existing guidelines, which recommend beginning with an overview of the artwork, including subject matter, colours and composition, to be followed by a more vivid and particularized description (Salzhauer Axel & Sobol Levent, 2003, pp. 230-231).

The results of this analysis showed that the two lexical domains of POSITION and EXISTENCE are more activated by the verbs (33% and 48% of the verbs with a frequency of $\geq 0.05\%$ in the corpus, respectively). These two domains are related to the existence and location of the components of the artwork. Particularly, the existence verb “ser” (35.7%), meaning “to exist as having a specified quality, state or identity or belonging to a specified group or type”, and the position verb “estar” (16.4%), meaning “being in a certain location or position”, occur most frequently. ICON (31.7%) and COMPOSITION (17%) are the two components of the artwork most frequently activated in the AD of two-dimensional visual artworks, followed by COLOUR (6.8%) and SHAPE (6.6%).

The AD of *Trata de blancas* has three levels of semantic specificity. These three levels are illustrated below with excerpts from the AD:

Level 1

(1) Es un óleo sobre lienzo de formato cuadrado, de aproximadamente dos metros y medio de alto por dos metros y medio de ancho.

“It is an oil painting on canvas, square, measuring approximately two and a half meters in height and width.”

(2) Este cuadro representa el interior de un vagón de tren de tercera clase con paredes de madera marrón oscuro.

“This painting depicts the interior of a third-class train compartment with dark brown wooden walls.”

(3) La escena es oscura.

“The scene is dark.”

Level 2

(4) Pegado a esta pared hay un segundo banco en el que dos muchachas duermen sentadas, con la cabeza caída hacia delante y ligeramente ladeada.

“Alongside this wall there is a second bench where two girls are sleeping in a seated position, with their heads down and slightly tilted to the side.”

(5) En la parte izquierda del lienzo, un tercer banco comienza en la esquina inferior izquierda y se extiende hacia el centro del cuadro.

“On the left side of the painting, a third bench begins from the left bottom corner and extends towards the centre of the painting.”

Level 3

(6) La otra está tumbada en el banco, con la cabeza apoyada en el regazo de la primera, de forma que sus pies y piernas quedan en primer plano.

“The other girl is lying down on the bench, with her head resting in the lap of the first girl, in such a way that her legs and feet lie in the foreground.”

(7) Destaca la que está tumbada, que viste una falda de lo que parece ser raso rosa con enaguas de volantes blancas.

“The girl who is lying down is highlighted; she is wearing a skirt of what appears to be pink satin with ruffled white petticoats.”

With regard to the formal components, the composition of an artwork is a crucial element of visual communication – it is used by artists to affect how an observer (re)interprets the visual message (Dondis, 2006, p. 108), and is therefore of great importance to visually impaired persons in order to experience and understand the artwork. *Trata de blancas* is a figurative painting belonging to the *costumbrista* genre and as such it aims to portray the social reality of the time. Since the function of the tour is to help receivers build a mental image of the painting and familiarize themselves with the works of Sorolla, a detailed description of the represented reality (iconic signs) is also fundamental. Moreover, Sorolla belongs to the Realism movement and has a particular interest in the effects of light, so tone and colour are important elements that help to convey the painter's style. Based on this analysis of the source text along with results from the aforementioned descriptive study and existing guidelines, four components were selected as especially relevant and included in the AD of *Trata de blancas* for the guided tour: iconic signs, composition, colour, and tone (see Appendix 2 for the audio description script).

In order to draw a more detailed picture of the AD of *Trata de blancas*, I carried out a semantic analysis of the text following the method described in this section. The results showed that POSITION (31%) and EXISTENCE (23%) are the two lexical domains more activated by the verbs, and COMPOSITION and ICON are the two components of visual communication more frequently activated by the verbal participants (see Figure 2).

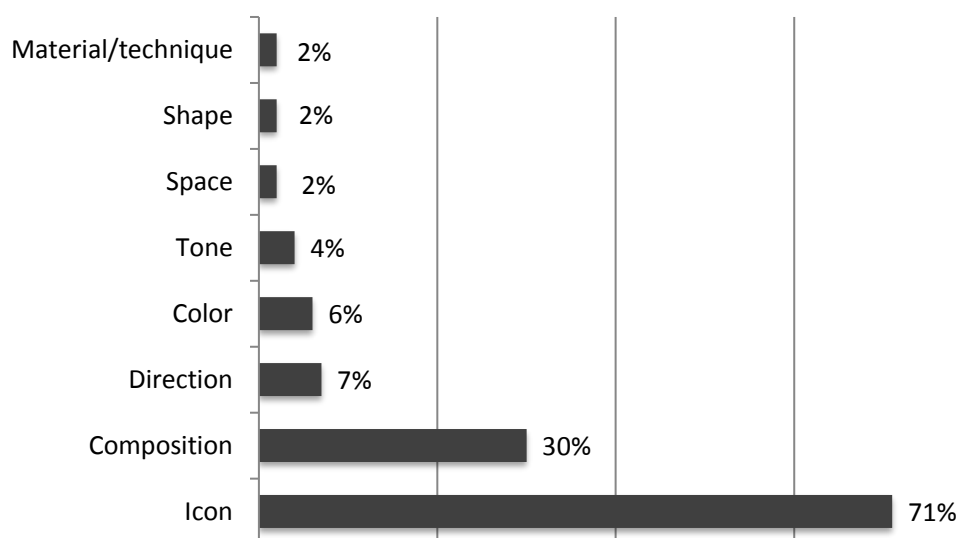


Figure 2. Frequency of the visual communication components in the AD

In this case, the importance of the icon category is related to the representational nature of the painting. For more abstract works, the AD of the basic visual elements (point, line, colour, etc.) becomes essential to facilitate access to the artwork for visually impaired people. In other words, the analysis of the source text and the documentation phase are fundamental to the selection of components from the source text to be translated and conveyed in the AD. Regardless of the level of abstraction, the composition of the painting and more specifically, the location of the different formal components are, according to Dondis (2006), paramount to understand a visual message. Therefore, it should be an essential aspect of visual art AD.

The specificity level will always depend on the complexity of the artwork, but in general terms this level is high in the method proposed. Given the diversity of needs and expectations among

visually impaired people, we consider highly specific ADs to be more universally accessible. Although they may be judged as unnecessarily long by some visitors with better access to the visual message, they may be preferred by visitors with the least access, and we believe that the latter should be prioritized in accessibility programs.

5. Touch to see: From visual interpretation to tactile reformulation

Tactile images are a translation of visual images that imply a selection of the most relevant visual content: "The person responsible for the transfer interprets the picture, that is, analyses it and judges what is important to show in the tactile picture" (Eriksson, 2003, p. 103). This type of tactile translation of the visual has been proved to be useful not only for people with very low vision, but also for congenitally blind and late-blind individuals (Heller, McCarthy & Clark, 2005). As stated by Braun (2007, p. 366), "...in multimodal discourse coherence also needs to be achieved across different modes of communication". With regard to film AD, she claims that coherence between the AD and the other semiotic modes of the film must be built through intermodal links between sound and AD, and intramodal links between dialogue and AD (Braun, 2011, p. 650). Similarly, I claim that for guided tours in art museums, intermodal coherence must be built between the visual source text (the artwork), the verbal target text (the AD), and the tactile target text (the tactile image). For this purpose, the content selection for the tactile image of *Trata de blancas* and the sequence followed to explore it must be coherent with those used for the AD.

The tactile image of *Trata de blancas* was produced by Touch Graphics in thermoforming. Like the painting's AD, the tactile image focuses on the iconic signs and their distribution on the canvas, i.e. the work's composition. As in the AD, this tactile image shows three levels of translation of the visual source text. First, the shape of the work is indicated by a relief frame that surrounds the tactile image. At the second level, the most relevant iconic signs are translated into relief contours that allow the visually impaired receiver to perceive their shape and location. Finally, textures are added to some of these contours in order to facilitate the tactile distinction. Additionally, the pictorial representation of depth is translated to the tactile image by gradually diminishing the contours' height as the elements they represent move further away from the viewer (see Figure 3). This feature is supported by research on tactile image recognition suggesting that congenitally blind people are able to understand some aspects of perspective in raised-line drawings even if they are not familiar with this type of representation (Heller, Calcaterra, Burson & Tyler, 1996; Heller *et al.*, 2002).



Figure 3. Design file of the tactile image of *Trata de blancas*

As stated in existing guidelines (Kardoulis, 2003, p. 291), the tactile image is used in combination with verbal instructions (see Appendix 3 for the verbal instructions script for the tactile image of *Trata de blancas*). The function of the verbal instructions is to organize the tactile exploration in a sequential way so that it facilitates the integration of the different elements into a mental image of the work, and to relate the contours and textures of the tactile image to the elements depicted in the artwork and translated in the AD. In the *Describing Sorolla* tour, the tactile exploration takes place after the AD and two discourse moves (Biber, Connor & Upton, 2007) are repeated in a cyclical way in order to guide the visitors' exploration:

Move 1: Location. Instructions are given to move the hands from a starting point in a certain direction until noticing a tactile element (contour or texture).

Move 2: Identification. The tactile component is related to the component of the artwork previously mentioned in the AD of the painting.

This cycle is illustrated in the following excerpts:

(8) Coloca las dos manos en la esquina inferior derecha y desplázalas lentamente hacia arriba. Notarás en primer lugar una línea curva. Es el contorno del hato de ropa.

“Put your hands on the right bottom corner and move them slowly upwards. You will first notice a curved line. This is the outline of the clothes bundle.”

(9) Desde ahí, baja las manos hasta notar una trama de puntos. Es la muchacha que duerme reclinada sobre el banco de la izquierda. Sigue bajando hasta notar una trama de líneas curvas paralelas. Es la falda de la muchacha que duerme tumbada en el banco de la izquierda.

“From there, lower your hands until you notice an area with dots. This is the girl who is sleeping in a leaning position on the bench to the left. Continue moving downwards until you notice an area of curved parallel lines. This is the ruffled skirt of the girl who is sleeping lying down on the bench to the left.”

The AD first provides visitors with a verbal translation of the visual communication components. The verbal instructions then refer to the same components to guide the tactile

exploration and help users build a more accurate mental image of the painting. These intermodal links are illustrated in Table 3 (highlighted in bold).

Audio description	Verbal instructions
<p>En la parte izquierda del lienzo, un tercer banco comienza en la esquina inferior izquierda y se extiende hacia el centro del cuadro... En la parte de la izquierda duermen otras dos muchachas. Una, la que está al fondo, está sentada de lado en el banco de manera que su cuerpo queda mirando hacia nosotros... La otra está tumbada en el banco, con la cabeza apoyada en el regazo de la primera, de forma que sus pies y piernas quedan en primer plano.</p> <p>“On the left side of the painting, a third bench begins from the left bottom corner and extends towards the centre of the painting... On the left-hand side, two other girls sleep. One, the one at the back, is seated sideways on the bench so that her body remains facing toward us... The other is lying on the bench, with her head supported by the lap of the first, in a way that her feet and legs remain in the foreground.”</p>	<p>Es la muchacha que duerme reclinada sobre el banco de la izquierda.</p> <p>“This is the girl who is sleeping in a leaning position on the bench to the left.”</p>
<p>Destaca la que está tumbada, que viste una falda de lo que parece ser raso rosa con enaguas de volantes blancas.</p> <p>“The girl who is lying down is highlighted, she is wearing a skirt of what appears to be pink satin with ruffled white petticoats.”</p>	<p>Es la falda de la muchacha que duerme tumbada en el banco de la izquierda.</p> <p>“This is the skirt of the girl who is sleeping lying down on the bench to the left.”</p>

Table 3. Content selection in the AD and the verbal instructions

The tactile exploration and the AD follow the same order, which builds yet another level of intermodal coherence. The order chosen to audio describe a painting and to guide the exploration of its tactile translation depends on the level of abstraction of the source text and its composition (Soler Gallego, Luque Colmenero & Rodríguez Posadas, 2016). For this realist painting, the figures' proximity makes spatial contiguity a better technique with which to describe and explore the image. Rather than proceeding horizontally from the background to the foreground or vice versa, as suggested in existing guidelines (Kardoulias, 2003, p. 292), the truncated triangle "drawn" by the figures' arrangement is used to audio describe the composition and to guide the tactile exploration. Both the AD and the tactile exploration start with the right side of the painting, continue to the upper side and end at the left side. This progression is illustrated in Table 4.

Audio description	Verbal instructions
<p>A la derecha del cuadro está la pared exterior del vagón, con dos pequeñas ventanas. Pegado a la pared hay un primer banco que se extiende desde la esquina inferior derecha hacia el centro del lienzo. En este banco se sienta la mujer mayor con la espalda apoyada en la pared y la cabeza ligeramente vuelta hacia nosotros... A su izquierda, sobre el banco y en primer plano, hay varias piezas de equipaje...</p> <p>"On the right side of the painting is the outer wall of the train compartment, with two small windows. Alongside this wall, there is a bench which extends from the bottom right corner to the centre of the painting. The old woman is seated on this bench, with her back resting against the wall and her head slightly turned towards us... To her left, on the bench and in the foreground of the painting, there are various pieces of luggage..."</p>	<p>...coloca las dos manos en la esquina inferior derecha. Notarás en primer lugar una línea curva. Es el contorno del hato de ropa. Continúa hacia arriba hasta notar unas líneas rectas: son la maleta del equipaje. Continúa hacia arriba y notarás un área lisa en relieve. Es el cuerpo de la mujer mayor.</p> <p>"...place your hands on the bottom right corner. You will first notice a curved line. This is the outline of the clothes bundle. Continue moving upwards until you notice some straight lines: they form the portmanteau among the luggage. Continue upwards and you will notice a smooth area in relief. This is the body of the old woman."</p>
<p>Frente a vosotros, en el fondo del vagón, hay otra pared que se extiende hacia la izquierda del cuadro, donde se pierde. Pegado a esta pared hay un segundo banco en el que dos muchachas duermen sentadas, con la cabeza caída hacia delante y ligeramente ladeada.</p> <p>"In front of you, at the back of the compartment, there is another wall which extends to the left of the painting, where it disappears. Alongside this wall there is a second bench upon which two girls are asleep in a seated position, their heads bowed and slightly tilted."</p>	<p>Ahora desplaza la mano hacia la izquierda hasta notar una trama de líneas horizontales paralelas. Es una de las dos muchachas sentadas en el banco del fondo.</p> <p>"Now move your hand to the left until you encounter a series of parallel horizontal lines. This is one of the two girls seated on the bench in the background".</p>
<p>A la izquierda del lienzo, un tercer banco comienza en la esquina inferior izquierda y se extiende hacia el centro del cuadro... El banco tiene un respaldo de madera que está unido al asiento y al techo del vagón por unas barras de metal. En este banco duermen otras dos muchachas...</p> <p>"On the left side of the painting, a third bench begins at the bottom left corner and extends towards the centre of the painting... The bench has a wooden backrest which is fastened to the seat and the compartment roof by metal bars. On this bench, two other girls are sleeping..."</p>	<p>Desde ahí, baja la mano hasta notar una trama de puntos. Es la muchacha que duerme reclinada sobre el banco de la izquierda.</p> <p>"From there, lower your hand until you notice an area with dots. This is the girl who is sleeping in a leaning position on the bench to the left."</p>

Table 4. Information structure in the AD and the verbal instructions

In summary, the selection of components from the source text for the AD and the tactile image should be consistent to foster intermodal coherence between the verbal mode and the tactile mode. Likewise, the verbal instructions to explore the tactile image should refer to the

components included in it and previously mentioned in the AD. Finally, the verbal instructions should follow the same order or sequence as the AD to ensure yet another level of intermodal coherence and facilitate understanding of the multimodal discourse made of the source text, the AD, and the tactile image.

6. Conclusions

Nowadays, a growing number of museums offer accessibility resources for visually impaired visitors. The general trend seems to be towards designing multisensory experiences where information is conveyed through different semiotic modes and channels. In Spain, the museums' response to recent laws on accessibility has been positive. As a result, museum accessibility has developed considerably in this country within the past few years. Combining resources that allow for visitors' autonomous visit and audio descriptive guided tours, which provide an inclusive social event, could be essential to the improvement of accessibility for visually impaired visitors of museums in the following years.

By moving from theoretical and descriptive research to applied research in AD studies, it is possible to have a direct and positive impact in the provision of resources that guarantee equal access to culture, education and society by people with a visual impairment. This article has offered a detailed description of a method to design audio descriptive guided tours with tactile exploration for art museums, in which the visual source text, the AD and the tactile image relate to each other to create a coherent multimodal discourse. The interrelated analysis of the artwork's AD, the tactile image and the verbal instructions for its tactile exploration, allow us to describe the intermodal links that are to be created between these three elements and the artwork in order to facilitate access for visually-impaired people to the art museum experience. The translation of visual content into the verbal-auditory and tactile modes exposed in this article is addressed to a prototypical completely blind visitor. In order to adapt the tour to different visitor profiles, it is essential to foster visitors' participation so that they may express their needs and perceptions. By doing so, they are given the opportunity to contribute to the creation of a more dynamic, collaborative and inclusive experience of visual art in the museum context.

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Appendix 1. Audio description of the visual communication components

Technique

It is a detailed **etching** showing a narrow road or track into Wivenhoe across fields of tall grass.

Material

The final zip is tan, and almost looks like raw canvas. But closer examination shows that it too is **paint**.

Style

This is an **abstract expressionist** painting.

Composition

A bluish-black bird with long tail feathers and an orange underbelly **sits on a branch** in profile, facing to the right, silhouetted against the patch of blue sky behind him.

In front of her, another woman sits or squats, elbow on one raised knee, which juts toward the center of the painting.

The result is an intricate, rigid **geometric pattern**, set against an off-white background.

Dot

Little **dabs** and dashes of paint seem to dance over the surface of the canvas – white, red, blue, deep purple, pink and green.

Line

This expanse of colour is interrupted by five thin vertical **stripes**. Each is an inch or two wide, but no two are exactly alike.

Shape

In the center is an open **cylinder** representing the sound hole; it is about three inches wide and protrudes out about five inches.

Space

There is only the slight **illusion of depth** created by their circle of joined hands.

Dimension

That is due partly to the subdued lighting – as requested by the artist Mark Rothko - and partly to the fact that the paintings are **huge** – and, since they are without glass, sound-absorbent.

Movement

Little dabs and dashes of paint seem **to dance** over the surface of the canvas – white, red, blue, deep purple, pink and green.

Direction

The next pole, in the back corner of the platform to your right, is about 8 inches wide and shaped like a surfboard, tapering at both ends. It faces in, **toward the center pole**.

Texture

Knowing that the work is made of steel, you might imagine it being **smooth**, shiny and reflective. In fact it is the opposite. It is dark grey, and the surface is dull and appears **rusty and weathered**.

Tone

The **shadows** are somewhat heavier across the left side of his torso and along his left shoulder and upper arm.

Color

The upper right corner is an especially **bright and sunny yellow**, as if it is an extension of the landscape at sunset.

Appendix 2. Audio description script

Estamos ante una pintura realizada por Sorolla en el año 1894 titulada *Trata de blancas*. Es un óleo sobre lienzo de formato cuadrado, de aproximadamente dos metros y medio de alto por dos metros y medio de ancho.

Este cuadro representa el interior de un vagón de tren de tercera clase con paredes de madera marrón oscuro. En él viajan cinco mujeres: una mujer mayor, que está despierta, y cuatro muchachas jóvenes, que duermen. Están distribuidas en tres bancos de madera: uno a vuestra derecha, otro a vuestra izquierda, paralelo al anterior, y otro frente a vosotros, en el fondo del vagón. Todas llevan la cabeza cubierta con un pañuelo doblado en triángulo y atado bajo el mentón. Visten también mantón cruzado sobre el pecho y falda larga hasta los tobillos. Vamos a ver más detenidamente la composición del cuadro y cada uno de estos personajes, comenzando por la derecha, siguiendo por el fondo y terminando por la izquierda.

A la derecha del cuadro está la pared exterior del vagón, con dos pequeñas ventanas. Pegado a la pared hay un primer banco que se extiende desde la esquina inferior derecha hacia el centro del lienzo. En este banco se sienta la mujer mayor con la espalda apoyada en la pared y la cabeza ligeramente vuelta hacia nosotros. La piel de su rostro dibuja numerosas arrugas, tiene los ojos entreabiertos y la mirada perdida, y viste de negro de pies a cabeza. A su izquierda, sobre el banco y en primer plano, hay varias piezas de equipaje: una guitarra, una maleta de piel, una cesta de mimbre, una bolsa de viaje y un hato de ropa que queda cortado por el borde del lienzo.

Frente a vosotros, en el fondo del vagón, hay otra pared que se extiende hacia la izquierda del cuadro, donde se pierde. Pegado a esta pared hay un segundo banco en el que dos muchachas duermen sentadas, con la cabeza caída hacia delante y ligeramente ladeada. Sus ropas en general son oscuras, con tonos marrones, azul marino y negro, salvo por el rojo del pañuelo con que una de ellas cubre su cabeza.

A la izquierda del lienzo, un tercer banco comienza en la esquina inferior izquierda y se extiende hacia el centro del cuadro. Tras este banco no hay pared, sino que el vagón continúa en esa dirección, sin que veamos qué sucede en él. El banco tiene un respaldo de madera que está unido al asiento y al techo del vagón por unas barras de metal. En este banco duermen otras dos muchachas: una está sentada de lado en el banco y, por tanto, de frente a nosotros, con la cabeza y las manos apoyadas en el respaldo. La otra está tumbada en el banco, con la cabeza apoyada en el regazo de la primera. Las faldas de estas tienen colores más claros que las ropas de las demás. Destaca la que está tumbada, que viste una falda de lo que parece raso rosa con enaguas blancas con volantes.

La escena es oscura, apenas iluminada por la tenue luz que se filtra a través de las ventanas e ilumina la pared del fondo del vagón y las faldas de las muchachas del banco de la izquierda. Los blancos y rosas de estas faldas contrastan con el negro de la ropa de la mujer mayor y los tonos marrones de las paredes de madera del vagón.

El rostro de las mujeres está pintado con bastante detalle, al igual que las texturas de los diferentes materiales que aparecen en la escena: la desgastada madera de las paredes, el entramado del mimbre de la cesta, el brillante raso de la falda de la muchacha en primer plano y las arrugas y los efectos de luz en la vestimenta de todas ellas.

Appendix 3: Verbal instructions for exploring the tactile image

Este diagrama táctil es una imagen simplificada de la obra superpuesta a una reproducción del original. El diagrama representa los contornos y áreas de los elementos más relevantes de la obra. Los contornos son líneas en relieve y las áreas están marcadas con tramas diversas.

El diagrama de la obra está centrado en la lámina y enmarcado por una línea continua. Encima de la obra figuran el título y la fecha de la obra en Braille y en español. Primero, explora la imagen con las dos manos para conocer el tamaño y hacerte una idea general de las texturas y elementos que contiene.

Ahora, coloca las dos manos en la esquina inferior derecha. Notarás en primer lugar una línea curva. Es el contorno del hato de ropa. Continúa hacia arriba hasta notar unas líneas rectas: son la maleta del equipaje. Continúa hacia arriba y notarás un área lisa en relieve. Es el cuerpo de la mujer mayor. Ahora desplaza la mano hacia la izquierda hasta notar una trama de líneas horizontales paralelas. Es una de las dos muchachas sentadas en el banco del fondo. Desde ahí, baja la mano hasta notar una trama de puntos. Es la muchacha que duerme reclinada sobre el banco de la izquierda. Sigue bajando hasta notar una trama de líneas paralelas. Es la falda de la muchacha que duerme tumbada en el banco de la izquierda.

Ahora coloca las manos en la esquina superior derecha y desplaza la mano lentamente hacia la izquierda hasta notar dos líneas verticales paralelas. Es uno de los dos ventanucos que iluminan el vagón.



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