

# Uses of Multiple Senses for The Visually Improved Museum Visitors

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## Görme Engelli Müze Ziyaretçilerine Yönelik Çoklu Duyu Kullanımları\*<sup>1</sup>

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#### Özet

Son dönemlerde artan erişilebilirlik çalışmaları, kültür alanlarında da farkındalık oluşturmaya başlamış; gerçekleştirilen uygulamalarla dezavantajlı olarak görülen özel grupların toplumun bir parçası olarak sosyal yaşamda yer almaları desteklenmiştir.

Engellilik durumuna göre farklılık gösteren ihtiyaçlar göz önüne alındığında, müzeler için en dezavantajlı grubu görme engelliler oluşturmaktadır. Bu durumun birincil nedeni müzelerin öncelikli olarak görsel algıya yönelik mekânlar olmasıdır. Günümüzdeki sergileme sistemlerinin geliştirilmesi, dokunma ve işitme duyularıyla birlikte koklama ve tatma duyularını da harekete geçirerek ziyaretçilerin eser erişilebilirliğini desteklemiştir. Böylece, duyuların birleştirilmesiyle ortaya çıkan duyuşal müzecilik anlayışı şekillenmiş ve özellikle görme engellilerin müze erişilebilirliğine büyük ölçüde katkı sağlamıştır.

Hazırlanan makalede, görme engelliler için kullanılan çok modlu sergileme yöntemleri ele alınmıştır. Makalenin merkezinde, bu ziyaretçilerin müze erişilebilirliğini sağlayan uygulamalarda kullanılan duyuşal çeşitliliğin örneklendirilmesi amaçlanmıştır. Bu kapsamda müzelerin görme engelliler için ziyaret edilebilir hale gelmesini sağlayan dokunsal erişim çalışmaları araştırılarak görme engelliler için hazırlanan dokunsal turlarda kullanılan yöntemlerin teorik gelişimi incelenmiştir. Ardından yeni teknoloji araçlarının müzecilik çalışmalarında kullanılmaya başlamasıyla sergilerde artan farklı duyu kombinasyonları belirlenerek örneklendirilmiştir.

**Anahtar Kelimeler:** Görme, Engelli, Müze, Erişilebilirlik, Duyusal Müzecilik.

#### Abstract

Accessibility studies, which have recently increased, have started to raise awareness in cultural areas; with the practices realized, special groups that are seen as disadvantaged have been supported to take part in social life as a part of society. Considering the needs that differ according to disability status, visually impaired people constitute the most disadvantaged group for museums. The primary reason for this situation is that museums are primarily places for visual perception. Today, the development of display systems has supported the accessibility of artifacts by activating the senses of smell and taste, as well as the senses of touch and hearing. Thus, the understanding of sensory museology, which emerged by combining the senses, was shaped and greatly contributed to the museum accessibility of the visually impaired.

In this article, multimodal exhibition methods used for the visually impaired are discussed. At the center of the article, it is aimed to exemplify the sensory diversity used in applications that provide museum accessibility for these visitors. In this context, the theoretical development of the methods used in the tactile tours prepared for the visually impaired was investigated by researching the tactile access studies that make the museums visitable to the visually impaired. Then, with the use of new technology tools in museum studies, the different combinations of senses that increased in the exhibitions were determined and exemplified.

**Key Words:** Visual, Disableds, Museum, Accessibility, Sensory Museology.

<sup>1</sup> The article was derived from the master's thesis of the author.

\* Date of Arrival: 02.07.2022 – Date of Acceptance: 11.10.2022

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## Introduction

The visually impaired are one of the groups that are negatively impacted the most in museums among the large minority of disabled people. This is because museums are primarily designed for the sense of sight, and accessibility studies in museums typically focus on physical arrangements.

The development of new technologies and the expansion of disability studies over the past four decades have altered the behaviour of museums. These modifications have facilitated the disabled's access to museums and have contributed to the evolution of museology. In addition, thanks to multi-modal applications within the scope of sensory museology that combine touch, hearing, smell, and taste, the exhibitions have shifted the access centre of museums from physical to sensory.

Sensory museology studies, which make exhibition accessibility possible by implementing a new museology approach, are particularly important for visually impaired visitors, and these studies have become indispensable for encouraging museum visits by visually impaired individuals.

This study examines the evolution of museum access methods, including those for the visually impaired, and the use of other senses to support this evolution. In the article, examples of multimodal applications that utilise multiple senses and are effective for visually impaired museum access are provided. In these examples, the senses of touch and hearing, which are utilised more frequently by visually impaired individuals to comprehend the work, are highlighted, and a general evaluation is conducted.

### 1. Museums and the Visually Impaired

Visually impaired individuals are those who were born blind, have lost their sight for various reasons, or have vision below a certain threshold. According to Jun Dong Cho (2021: p. 14), an expert on sensory interactions and technological tools, sighted individuals perceive incoming information as 60% visual, 20% auditory, and 20% based on their senses of touch, taste, and smell. In this context, it should be

predictable that visually impaired individuals will have difficulty learning the visual culture elements correctly and completely. In order to combat social inequality, Richard Sandell, a professor at the Leicester University School of Museum Studies, suggested (2002: pp. 4–18) that museums should provide effective solutions for the cultural problems of visually impaired visitors.

According to researchers on museum accessibility, Jonathon Rix, Helena Garcia Carrizosa, Jane Seale, Kieron Sheehy, and Simon Hayhoe (2020: p. 1048), the visually impaired are the least evaluated group in museum studies conducted on people with sensory and other differences. These individuals' museum visits are deemed unnecessary. According to Valeria Donnarumma (2010: p. 5), who examines the museum accessibility of the visually impaired in art museums. For some, a visually impaired individual visiting a museum is comparable to a hearing individual attending a concert. Roberto Vaz, Diamantino Freitas, and Antonio Coelho, who conduct research on the use of multiple senses in museums (2020b: p. 17), have argued that museums have begun making accommodations for disabled access to disprove this notion and fulfil their societal responsibilities.

Historically, exhibition accessibility in museums has been regarded as a secondary accessibility layer. According to Tazuru Harada, Yanagisawa Hideyoshi, Eric Gressier-Soudan, and Camille Jean (2018: p. 2221), who study the use of multi-sensory approach in museums, this situation prevents visitors from interacting with the artefacts, resulting in a passive relationship based solely on sight. Fiona Candlin (2003: p. 103), who develops suggestions for visually impaired visitors in museums to find solutions to the visually impaired's issues of access, suggests that in museums one of the primary exhibition programmes should prioritise solutions that meet all the needs of disabled people.

Touch and hearing senses are most effective for visually impaired individuals' learning (D'Agnano et al., 2015: p. 207). In line with this information, studies on touch and hearing, the most effective access methods for the visually impaired, should also be conducted in museum applications. Audio descriptions for the visually impaired and tactile examination of artefacts are the longest standing methods of examination.

## 2. Evolution of Tactile Artefact Access

The primary sense that most museum exhibitions address is sight. Regardless of their skill level, the initial method for visually impaired individuals to obtain information from works of art is through touch. In this context, tactile museum tours are viewed as the most important aspect of learning and instruction for the visually impaired (Candlin, 2004: p. 74; Hayhoe, 2017: p. 46).

Touch-sight multisensory displays were implemented as the first non-auditory examples of multisensory combinations used in museums. Sensory museologist David Howes (2014: p. 60) asserts that the educational function of tactile tours was utilised for special visitors in the first museums of the 17th and 18th centuries. According to Jingyu Peng (2021: pp. 16-18), when 19th-century museums opened to the public, tactile tours were reduced, and modern museums became “sight museums” by directing the public to view the artefacts rather than touch them. With the increase in the number of museum visitors, touch tours have become a privilege reserved for the upper class, and with the privilege of touch tours, a new sense other than touch has been added to sight, for example audio explanations in tours led by guides. The fact that visitors from lower social classes tend to touch more than those from higher social classes is considered a limiting factor for touching (Sandell, 2003, p. 45).

The use of the sense of touch in the earliest museums was motivated by four factors: viewing the works as a learning tool, facilitating access to perceive the beauty of the work, enhancing the enjoyment of art through aesthetic appreciation, and establishing a close relationship between the object and the visitor (Peng, 2021: p. 16). In other words, these touch applications that were implemented in the early years of European museums were not intended for the visually impaired. According to Virginia Kastrup and Eliana Sampaio (2012, p. 96), who investigate the tactile experiences of the visually impaired in museums, tactile tours are implemented primarily to enhance the museum experience.

At the beginning of the 20th century, natural history collections housed the first studies designed for the

visually impaired (Hayhoe, 2017: p. 45). The American Museum of Natural History initiated practises for the visually impaired in 1909 when museum staff gave natural history lessons to visually impaired clubs and meetings. Dr Hermon C. Bumpus, the director of the museum at the time, requested that a room be prepared for the collections that attract the attention of the visually impaired, so a room was made available for students to receive instruction (Blind Kids’ Experience, 2021, par. 2) (Picture 1). It is known that tactile tours continued to be conducted for the visually impaired in the United States until the 1950s, albeit in small numbers (Hayhoe, 2017: p. 46).

Diversification has begun to emerge in the implementation of exhibitions because of the increase in presentations for the visually impaired, but the need to protect both the artwork and the visitor becomes concerning. According to Abigail Housen and Karin DeSantis (2003: p. 430), the New York Museum of Art provided tactile access to the sculptures for the visually impaired using protective gloves in the early 1970s. In addition to Braille writings, verbal descriptions were used during tactile tours, so that the sense of touch was accompanied by hearing.

The “Sculpture for the Blind” exhibition at the Tate Gallery in 1976 was the first major tactile exhibition in England and influenced the proliferation of similar exhibitions (Donnarumma, 2010: p. 35). In the 1980s, these exhibitions encouraged museums and galleries to develop creative learning spaces (Kastrup and Sampaio, 2012: p. 98). Disability movements, which gained global prominence during the same period, influenced the work of museums and made possible institutional accommodations for the disabled. In particular, the United Nations’ declaration of 1981 as “International Year of Disabled Persons” was effective in regulating the cultural access of individuals with disabilities. The Association of Museums and Galleries (MAGDA), founded in 1986 to advocate for the disabled, organised training and discussion seminars on this topic (Hooper-Greenhill, 1999: p. 156; Weisen, 2018: p. 12).

Increasingly museum studies in the 21st century have shifted the focus of museums away from the collection and towards the audience (Hayhoe, 2017: p. 46).

In this period, although the visitors took place completely as spectators, the museum started to think

again about encouraging the touching of artifacts (Peng, 2021: p. 17). In addition, a variety of training sets for tables describing various materials were developed to aid the perception of visually impaired visitors (Multi-Sensory Discovery, 2021, par. 4) (Picture 2). In this context, with the help of new technological tools, three-dimensional replicas and tactile interfaces that facilitate perceptible access for the visually impaired have begun to be developed (Cho, 2021: p. 4). Even though the traditional method of physical access, direct contact with the artefact, is still in use; replicas or digital interfaces are utilised for sensitive or large-scale artefacts.

The creation of replicas of the works in various sizes using three-dimensional printers prevent the works from being damaged and allow visitors physical interaction. According to Radu Comes (2016: pp. 60-61) who works on technological systems in museums, a variety of materials including embossed paper, thermoformed plastic, three-dimensional printing, resin moulding, carved wood, stone, and fabric are used to provide tactile access to the works. Materials are shaped using three-dimensional systems such as light scanners and laser scanners.

Following the development of three-dimensional replicas, virtual replicas were created. By developing an interface, virtual copies of the works created in the digital environment were arranged. Some interfaces perceived through a pen offer visitors tactile feedback regarding the weight, shape, texture, and material of the objects (Vaz et al., 2020a: p. 62). (Picture 3). These studies have become a trend in the new understanding of museology and one of the most influential aspects of sensory museology (Howes, 2014: p. 259). In other words, thanks to new technological tools, the use of multiple senses has improved, it is now possible to prepare various combinations of experiences, and the recognition of sensory museology has been enhanced.

### **3. Sensory Museology and Multi-Sensory Combinations**

The programs created with today's museum understandings aim to benefit the individual rather than the museum and to increase quality of life (Sandell, 2002: p. 6). Mark Clintberg (2014: p. 313), who

conducts research on the sensory access of museums, argues that in addition to touch in the first museums where tactile tours began, in some cases the works were smelled and even tasted. When Western museology models are examined, it is seen that the works are generally selected according to their visual qualities and additional evaluations are made for other sensory situations.

According to Jamie Kwan, Jean Ho Chu, Daniel Harley, Melanie McBride, and Ali Mazalek's (2016: p. 483) research, which examined multi-modal prototypes in artefact access; the handling of sensory experiences in social studies in the 1990s enabled multi-sensory studies to be used in museums as well. Hearing, touch, smell, and taste were included in temporary exhibitions and museums where new technologies are used, according to Christine Axel and Nina Levent's (2003: p. 426) research on museum access and the visually impaired. According to studies, learning techniques that involve all the senses help to strengthen memory. It is also claimed that multi-sensory stimuli help all museum visitors, including those with disabilities, remember the exhibits more easily (Harada et al., 2018: pp. 2221-2222). Using the senses of touch and smell stimulates the neurons responsible for vision, allowing visually impaired individuals to perceive visual arts. In addition, it is believed that the senses of smell and hearing, in addition to sight, combine in the brain to contribute to the perception of an object's composition. According to Siyi Wang (2020: p. 4), an expert on the senses, the use of diverse sensory associations in sensory museology has facilitated the perception and experience of artefacts.

Monica Randaccio (2018: p. 290), an expert on audio descriptions and multimodal studies in museums, positioned multimodality at the centre of sensory museology and shared the view that linguistic, visual, auditory, and tactile modes acquire meaning through their interaction. This perspective is comprised of experiences in which the sensory properties, contexts, and stories of historical objects are discussed to enhance information accessibility and visitor interaction in museums. Multimodality can be described as the combination of multiple senses for the visually impaired, compensating for their lack of vision through sound, texture, temperature, and smell (Cho, 2021: p. 2). The development of new technology

tools has facilitated the use of touch in museums, and applications such as video screens, sound systems and digital scent machines are also supported in multi-sensory studies (Howes, 2014: p. 263). Thus, it could be said that museums have begun to emphasise the sense of touch, as a therapeutic and cultural tool, the sense of hearing, as a communication medium, and the sense of smell, which evokes emotions using the imagination.

After sight, hearing is the most frequently activated and paired with other senses in exhibitions for all visitors, including those with visual impairments, in museum technology systems. This is because museums are full of various sounds, including footsteps, visitor whispers, guide conversations, and music (Peng, 2021: p. 23). This must make sounds in museums, especially for the visually impaired, at least as effective as sight.

Since hearing and touch are the most effective means of information access for the visually impaired, exhibitions designed for these visitors emphasise the combination of hearing and touch. In museum exhibitions for the visually impaired, audio information is available for most works. In these exhibitions, while providing information about the work, tactile access to the original or copy is also furnished. In some of the works created using touch-hearing combinations, general information is provided, while in others, more specific information is supplied. Tooteko's sensor replicas are one of the most outstanding examples of touch and hearing research in multimodal systems. A ring, which is stimulated by the sensors on the replicas, conveys information about the touched part of the artifact realising joint tactile and auditory access (D'Agnano et al., 2015: pp. 207-208) (Picture 4). Some exhibition stands also utilise sounds that represent the work. These descriptions include the sounds of the symbols on the artwork. For instance, the sounds of plants swaying in the wind are made audible to the visitor so that they can experience the work through hearing (Cho, 2021: p. 8).

The combination of touch and hearing is an example of common sense in Türkiye. With its work for the visually impaired, the Anatolian Civilizations Museum is among the most exemplary museums. It has conducted museum studies with disabled children since 2000. According to museum educator Halil Demirdelen (2020: pp. 28-44) tactile tours were organised with

replicas prepared by the museum, along with verbal descriptions in support of these studies. The Batman Museum contains a comparable example. Replicas of works designed for the visually impaired are displayed in stands with headphones and Braille labels, allowing visitors to use multiple senses (Batman Museum Directorate, 2022). There are other Turkish museums exhibiting diverse collections such as the Kayseri Seljuk Civilization Museum, the Beşiktaş JK Museum, and the İstanbul Modern Art Museum, among others, where touch and hearing applications are prepared for the visually impaired in both permanent and temporary exhibitions.

Smell is one of the senses paired with touch that visually impaired individuals can use to perceive the work directly for themselves. In the 1980s, historical sites, museums, and tourist attractions began to create scent-based exhibitions (Peng, 2021: p. 24). Due to the possibility of creating a tiring experience for museum visitors, or of people becoming distracted by the new smells, scents should be used with caution in exhibitions (Wang, 2020: p. 6). It is also claimed that the sense of smell is inadequate for perceiving the form of works of art (Harada et al., 2018: p. 408). Most permanent museum exhibits do not include the sense of smell, with a few exceptions (Kwan et al., 2016: p. 483). However, scented applications in museums offer all visitors, including the visually impaired, an engaging experience. When these olfactory arrangements are combined with other senses and incorporated into the exhibition, they encourage visitor interaction.

Despite the fact that the sense of smell can appeal to most visitors, it is sometimes activated by touch or sound for the visually impaired. The 2016 exhibition "Love on Earth: Taizhou Folk Traditions from the Perspective of Cultural Geography" at the Taizhou Museum in China was one of the best examples of combining hearing and smell. In the exhibition depicting folk traditions relating to production, life, trade, and belief from antiquity to the present, the smell of fish was added to the sound of waves and wind while depicting a fishing village (Wang, 2020: pp. 4-6) (Picture 5).

Even though the sense of smell is typically used to stimulate another sense in museum exhibitions, there are instances where it was used alone. Even though these examples, which utilise only the sense



of smell, are insufficient for the visually impaired, they supported the exhibition's accessibility. When it was difficult to stimulate multiple senses simultaneously during exhibitions, separate fragrance stands were created. Even though the fragrances in these stands were presented independently without tactile access or audio description, it provided multisensory access within the context of the exhibition as a whole. By pressing buttons or pedals, fragrance stands typically scent their surroundings (Picture 6) (Don't Just Look, 2021, par.3). In the State Archaeological Museum of Chemnitz, Germany, an example of these fragrance stands was crafted. In an exhibition about the Middle Ages, visitors are exposed to various smells of the streets of that time, such as burnt wood, spices, and the smell of toilets (The Staatliches Museum, 2021, par. 6) (Picture 7). Another example is the creation of a setup with a replica of "Prayer-Nuts" in the exhibition titled "Scents of Power" developed by Kwan et al. (2016: pp. 483-485). The replica placed on the stand was prepared to contain special scents created from spices, resins and essential oils associated with historical texts (Picture 8).

In sensory museology, the sense of taste is included alongside the sense of smell. However, in museums, the senses of smell and taste are regarded as more sensitive and possibly triggering than other senses (Harada et al., 2018: p. 2226). The diversity of tastes in various cultures enables museums to be viewed as an essential tool for conveying the history and culture of flavours and foods (Peng, 2021: 26). In certain instances, the taste of the object is presented to the visitor, and sometimes flavours are used to remind visitors of the exhibition's subject matter. Although taste is used in conjunction with other senses, it is primarily integrated with touch for visually impaired visitors. An example of such a study was conducted at the "Open House London Festival," which was organised by the Royal Academy of Arts in England in 2014, and exhibitions that stimulate the senses of texture and taste were prepared for festival attendees (All for Art, 2021).

Applications that combine the senses of touch, hearing, smell, and taste, in addition to the sense of sight, are not possible in all museums. However, there are instances in which the senses other than sight are combined in multisensory exhibitions of selected museum works. Typically, these exhibitions are composed of combinations of two or three senses.

These combinations included hearing and taste, hearing and touch, and hearing and smell. A similar application was made during the "Tate Sensorium" exhibition held between August 26, and October 4, 2015, at the Tate Modern Museum in England. The exhibition featured the creation of sounds, smells, and physical forms inspired by four paintings from the Tate collection. In this context, information about the work is heard while the sense of touch is provided by touch devices that are independent of the work. In the exhibition where chocolate designs were created, sea salt and cocoa were used to create aromas that stimulate the sense of taste. (IK Prize 2015, 2021, par.4) (Picture 9). The sense of taste is the most difficult to utilise. In the Netherlands, a tasting exhibition was carried out as an example at the 2019 Multi-Sensory Museum Symposium held at the Van Abbe Museum. A chocolate interpretation of an artefact was created with the work's multisensory activation supported by taste (Multisensory Museum Symposium, 2022, par.2) (Picture 10). In the same museum's "Unlinking and Reconnecting" exhibition, 120 works of art were touchable, smellable, and visible to all visitors (Delinking and Relinking, 2022). In this context, it was possible to create different layers of senses within the exhibition's framework. Although all senses except vision were included in the exhibitions, there was no simultaneous sense access.

## Conclusion and Evaluation

In general, visually impaired individuals, who have difficulty participating in social life due to environmental factors, have viewed museums as inaccessible locations. The fact that museums primarily appeal to the sense of sight is one of the reasons why visually impaired individuals view these locations as inaccessible. Through the development of accessible exhibition methods, in recent years, museums have attempted to address the issues of the visually impaired and their negative perceptions of museums. Audio guide and tactile access to artefacts are the earliest efforts made to make museums accessible to all individuals. Beginning with guides, auditory practises contributed to the development of sensory museology knowledge. Following these initial applications involving the senses of sight and hearing, the sense of touch was introduced. The first examples of sensory access studies involved the use of three senses, sight, hearing, and touch, in exhibitions. With the use of touch and hearing together,

museum access for the visually impaired has become relatively simple.

Even though the senses of sight and hearing are more conventional in museums, the use of the sense of touch has increased the sensory accessibility possibilities in museum exhibitions. Replicas and interfaces are used to present works that cannot be touched due to their size, value, or composition. These techniques have both safeguarded the artworks and expanded the opportunities for the visually impaired. However, it should not be overlooked that these replicas created in different environments should be of sufficient quality to convey to the visitor the original quality of the works.

With the increased usability of touch in museums, tactile tours in exhibitions have begun to be combined with other senses, and accessible exhibitions for the disabled have been created by combining touch-hearing, touch-smell, and touch-taste. Complementing these combinations with audio systems or guides facilitates the museum access of disadvantaged groups. Access to museums for the visually impaired should also involve the use of the senses of smell and taste, in addition to touch and hearing. However, it is believed that the use of the sense of smell in museum exhibitions should be scrutinised as it can be disturbing. In addition, it would be more appropriate to set up a fragrance stand in a specific area than to have the scent permeate the entire exhibition space.

Combining different sense experiences has been the primary method for making museum exhibitions accessible to visitors with visual impairments. Thus, it is evident that multisensory applications other than sight used in exhibitions increase both visiting pleasure and accessibility. Nonetheless, the multisensory stands, which rely heavily on the senses of smell and taste, are often arranged in distinct areas of the exhibition. Typically, smell and taste studies are conducted in separate stands from the work, and while this creates a sensory connection with the work, the physical connection is severed. For this reason, touch and hearing may be more effective than other senses in multisensory studies designed specifically for visually impaired participants.

It is evident that museums will become more accessible to the visually impaired when new applications are added to traditional exhibition

techniques. Conducting research for the visually impaired will both reveal the egalitarian nature of museums and promote the social inclusion of these visitors. The use of multiple senses, which will vary depending on the museum's capabilities and the exhibition's subject matter, will ensure accessibility for all visitors, including the visually impaired.

## Citations

All For Art: An Introduction To The RA's Access Programme, <https://www.royalacademy.org.uk/article/introduction-to-access-programme-ra>, Son Erişim Tarihi: 18 Ekim 2021.

Axel, E.S., Levent, N.L. (2003). *Art Beyond Sight: A Resource Guide To Art, Creativity, And Visual Impairment*. New York: American Foundation For The Blind.

Batman Müzesi Müdürlüğü'nde Gerçekleştirilen Engelsiz Müze Projesi, <https://kvmgm.ktb.gov.tr/TR-149154/batman-muzesi-mudurlugunde-gerceklestirilen-engelsiz-mu.html>, Son Erişim Tarihi: 5 Kasım 2021.

Blind Kids' Experiences at the Early-20th-Century Museum of Natural History, <https://slate.com/human-interest/2014/12/history-of-blind-education-photos-of-tactile-classes-at-the-american-museum-of-natural-history.html>, Son Erişim Tarihi: 25 Kasım 2021.

Buyurgan, S. (2009). Görme Yetersizliği Olan Üniversite Öğrencilerinin Müzelerden Beklentileri. *Kuram ve Uygulamada Eğitim Bilimleri*, 9/3, 1167-1204.

Candlin, F. (2003). Blindness, Art And Exclusion In Museums And Galleries. *International Journal Of Art & Design Education*, 22/1, 100-110.

Candlin, F. (2004). Don't Touch! Hands Off! Art, Blindness And The Conservation Of Expertise. *Body & Society*, 10/1, 71-90.

Cho, H., Jolley, A. (2016). Museum Education For Children With Disabilities Development Of The Nature Senses Traveling Trunk. *Journal Of Museum Education*, 41/3, 220-229.

Cho, J. (2021). A Study Of Multi-Sensory Experience And Color Recognition In Visual Arts Appreciation Of People With Visual Impairment. *Electronics*, 1-37.

Clintberg, M. (2014). Where Publics May Touch: Stimulating Sensory Access At The National Gallery Of Canada. *The Senses and Society*, 9/3, 310-322.

Comes, R. (2016). Haptic Devices And Tactile Experiences In Museum Exhibitions. *Journal Of Ancient History And Archaeology*, 3/4, 60-64.

D'agnano, F., Balletti, C., Guerra, F., Vernier, P. (2015). Tooteko: A Case Study Of Augmented Reality For An Accessible Cultural Heritage. Digitization, 3D Printing And Sensors For An Audio-Tactile Experience. *The International Archives Of Photogrammetry, Remote Sensing And Spatial Information Sciences*, 40/5, 207-213.

Delinking And Relinking Multi-Sensory Collection Display, <https://vanabbemuseum.nl/en/programme/programme/delinking-and-relinking/>, Son Erişim Tarihi: 19 Haziran 2022

Demirdelen, H. (2020). *Anadolu Medeniyetleri Müzesi'nde Gerçekleştirilen Eğitim Etkinliklerinin Değerlendirilmesi*, Ankara Üniversitesi, Yayınlanmamış Yüksek Lisans Tezi, Ankara.

Donnarumma, V. (2010). *L'accessibilité Des Musées D'art Aux Handicapés De La Vue: Une Question De Médiation*, Yayınlanmamış Doktora Tezi, Université De Neuchâtel, Neuchâtel.

Graham, H. (2013). Museums And How To Know About Access. *New Formations*, 79/79, 64-81.

Harada, T., Hideyoshi, Y., Gressier-Soudan, E., Jean, C. (2018). Museum Experience Design Based On Multi-Sensory Transformation Approach, *DS 92: Proceedings of the DESIGN 2018 15th International Design Conference*, 2221-2228.

Hayhoe, S. (2017). *Blind Visitor Experiences At Art Museums*. Maryland: Rowman & Littlefield.

Hooper-Grenhill, E. (1999). *Müze ve Galeri Eğitimi* (Haz. Bekir Onur). Ankara, Çocuk Kültürü Araştırma ve Uygulama Merkezi Yayınları No 4.

Housen, A., De Santis, K. (2003). "Very Nice To My Visual Imagination Memory" An Inquiry Into The Aesthetic Thinking Of People Who Are Visually Impaired. *Art Beyond Sight*, 430-443.

Howes, D. (2014). Introduction To Sensory Museology. *The Senses And Society*, 9/3, 46-84.

Kastrup, V., Sampaio, E. (2012). Le Rôle De L'expérience Esthétique Tactile Dans L'apprentissage Des Personnes Handicapées Visuelles Dans Les Musées. *Savoirs*, 93-111.

IK Prize 2015: Tate Sensorium, <https://www.tate.org.uk/whats-on/tate-britain/ik-prize-2015-tate-sensorium>, Son Erişim Tarihi: 17 Aralık 2021.

Kwan, J., Chu, J. H., Harley, D., McBride, M., & Mazalek, A. (2016, February). Grasping Cultural Context Through Multisensory Interactions. In *Proceedings of the TEI'16: Tenth International Conference on Tangible, Embedded, and Embodied Interaction*, 482-487.

Multi-Sensory Discovery At The Musée d'Arts De Nantes. Erişim adresi: <https://tactilestudio.co/achievements/musee-darts-de-nantes-educational-kits-multi-sensory-path-tactile-model-nfc-chip-inclusion-in-museum/>, Son Erişim Tarihi: 9 Ekim 2021.

Multisensory Museum Symposium: Brief Summary, <https://www.thetbcproject.com/words/2019/3/17/multisensory-museum-symposium>, Son Erişim Tarihi: 19 Haziran 2022.

Onol, I. (2020). Tactual Explorations: A Tactile Interpretation Of A Museum Exhibit Through Tactile Art Works And Augmented Reality, *Touch In Museums*, 91-106.

Peng, J. (2021). *How Did That Interactive Make You Feel? Towards A Framework For Evaluating The Emotional And Sensory Experience Of Next Generation In-Gallery Technology*, Doctoral Dissertation, University Of Leicester.

Randaccio, M. (2018). Museum Audio Description Multimodal And 'Multisensory' Translation A Case Study From The British Museum. *Linguistics And Literature Studies*, 6/6, 285-297.

Rix, J., Carrizosa, H. G., Seale, J., Sheehy, K., Hayhoe, S. (2020). The While Of Participation: A Systematic Review Of Participatory Research Involving People With Sensory Impairments And/Or Intellectual Impairments. *Disability & Society*, 35/7, 1031-1057.

Sandell, R. (2002). Museums And The Combating Of Social Inequality: Roles, Responsibilities, Resistance, *Museums, Society, Inequality* (Ed. R. Sandell), New York: Routledge, 3-24.

Sandell, R. (2003). Social Inclusion, The Museum And The Dynamics Of Sectoral Change. *Museum And Society*, 1/1, 45-62.

Soler Gallego, S. (2018). Intermodal Coherence in Audio Descriptive Guided Tours For Art Museums, *Parallèles*, 30/2, 111-128.

Tactile Models, <https://www.unesco4all-tour.eu/the-tactile-talking-replicas>, Son Erişim Tarihi: 11 Mart 2022.

The Staatliches Museum Für Archäologie Chemnitz Focuses On Cultural Accessibility, <https://tactilestudio.co/achievements/staatliches-museum-fur-archaologie-chemnitz-multisensory-trail-tactile-station/>, Son Erişim Tarihi: 8 Ekim 2021.

Vaz, R., Freitas, D., Coelho, A. (2020A). Blind And Visually Impaired Visitors' Experiences In Museums: Increasing Accessibility Through Assistive Technologies. *International Journal Of The Inclusive Museum*, 13/2, 57-80.

Vaz, R., Freitas, D., Coelho, A. (2020B). Perspectives Of Visually Impaired Visitors On Museums: Towards An Integrative And Multisensory Framework To Enhance The Museum Experience, In *9th International Conference On Software Development And Technologies For Enhancing Accessibility And Fighting Info-Exclusion*, 17-21.

Wang, S. (2020). Museum As A Sensory Space: A Discussion Of Communication Effect Of Multi-Senses In Taizhou Museum. *Sustainability*, 12/7, 1-19.

Weisen, M. (2018). International Perspectives On The Cultural Accessibility Of People With Disabilities, *The Inclusive Museum Proceedings of the COME-IN!-Thematic Conferences*, (Ed. Jörn Berding, Matthias

Gather), Germany, Berichte des Instituts Verkehr und Raum, 12-17.

Weisen, M. (2020). How Accessible Are Museums Today?. *Touch In Museums* (Ed. H. J. Chatterjee), (243-252), New York: Routledge.



## Appendix



**Picture 1:** Touch Lessons for Blind Children at the American Museum of Natural History, 1917 (Blind Kids' Experience, 2021).



**Picture 2:** Velvet, Silk Fabric and Jewellery Samples from the Education Set at the Nantes Art Museum (Multi-Sensory Discovery, 2021).



**Picture 3:** Equipment and Application Providing Tactile Experiences to Digitized Artifacts (Comes, 2016: s. 62).



**Picture 4:** Ring and Replica Artefact Used in the Tooteko System (Tactile Models, 2022).



**Picture 5:** Shitang Fishing Village (Wang, 2020: s. 4).



**Picture 6:** Fragrance Dispensers Used in the New Exhibition at Mauritshuis in The Hague (Gerson, L.) (IK Prize 2015, 2021).



**Picture 7:** The Smell Station of the State Archaeological Museum of Chemnitz, Germany, Allowing Visitors to Discover Three Powerful Scents from the Middle Ages (The Staatliches Museum, 2021).





**Picture 8:** How Aromas Inspired by the Historical Ingredient Lists in the Power Fragrances Exhibition are Scented. (Kwan vd. 2016: 483-485).



**Picture 9:** Combining the Sense of Hearing and Taste in the Tate Sensorium Exhibition (IK Prize 2015, 2021).



**Picture 10:** Tasting Interpretation of Andrzej Wróblewski's Work (Multisensory Museum Symposium, 2022).