

The Use of Augmented Metadata in the Museum Environment

Charilaos Katsigiannis-Ippikoglou¹

Abstract:

The evolution of museums missions and their expanding roles in contemporary society have prompted transformative shifts in the management and presentation of cultural information. This bibliographic review delves into relevant studies focused on museum visitor behavior, the integration of digital technologies, and the effective management of information provided to visitors, through museum descriptions and historical documentation of artifacts. With a growing and diverse audience, extensive analyses have explored various visitor types and their distinct characteristics over the years, revealing nuanced perceptions of cultural exhibits. Museums are now tasked with prioritizing these differences when curating both permanent and temporary exhibitions. In response to this demand, digital technologies have assumed a pivotal role as auxiliary tools. Examples include the digitization of cultural exhibits, establishment of digital repositories, and the implementation of Collection Management Systems (CMS). However, the escalating volume of information that cultural organizations must handle, coupled with the immediate need to cater to the diverse characteristics of modern visitors, raises pressing issues warranting further investigation. This article aims to underscore the wealth of existing research on visitor classifications while introducing a new digital tool—augmented metadata exhibits—that has the potential to support museums in the creation of inclusive exhibitions.

Keywords: museums, museum visitors, museum studies, information science, new museology, augmented metadata

1. Introduction

Already since the 1970s and onwards, museums have recognized the need to understand their visitors' expectations regarding desirable experiences (Eda & Axel, 2019). In this context, a significant part of museum studies includes conducting research that examines the habits and preferences of museum visitors. Findings from these studies have confirmed the diversity among visitors in many areas, such as their movement within the museums space and the time they dedicate to observe the exhibits (Kali, 2018).

It has been bibliographically noted that each visitor is unique, with their individual preferences and habits, regardless of the space or exhibits. Consequently, the museum experience is equally unique for each person (John, 2013). Such an argument is entirely reasonable when one considers that each visitor arrives at the museum space with their own initiative and specific motivations. Furthermore, it is necessary to mention that each visitor carries their own unique identity and history (John, 2013), leading to different interpretations and perceptions of the exhibition content (Graham, 2014).

From the above, it is evident that it is no longer easy to create an exhibition of general content that will be equally successful for everyone. It may be well-received by some visitors, leave others indifferent, and possibly even displease some. Research has shown that different types of visitors seek different kinds of experiences based on the visitor category they belong to (Eda & Axel, 2019). Naturally, regardless of the category, each time they may seek a different type of experience (Eda & Axel, 2019). For example, one day they may visit the museum for educational purposes, while the next time they may visit simply for entertainment. Therefore, the idea of an audience with uniform characteristics and interests that could be satisfied by a single exhibition can no longer be the basis for organizing contemporary exhibitions.

¹ Department of Archival, Library and Information Studies, University of West Attica, Athens, Greece
Email address: Charis.ippikoglou@gmail.com

However, contemporary museums, to better meet the diverse needs of their audience and achieve the optimal visiting experience for most visitors, utilize various museum visitor studies. These studies are used by museum professionals to group the audience into categories based on their common characteristics. These can include the demographic characteristics of visitors, their way of movement within the space, the time and order of viewing exhibits, and even their interaction with them. Such studies serve as tools to help experts classify visitors and, consequently, organize exhibitions that better cater to the specific characteristics of their potential audience.

2. Sampling Museum visitor studies

Regarding museum visitors' studies, the literature on the subject is extensive. Beginning chronologically, Marilyn (1983) explored the reasons why visitors either visit or not art museums, as well as what are their preferences in terms of leisure activities. She identified six key attributes that constitute a desirable leisure experience. The first one is the presence of companions or social interaction. Secondly, being able to engage in meaningful activities. Feeling a sense of comfort and ease within the environment is the third one while the fourth one revolves around encountering novel challenges. Finally, having opportunities for learning and active participation are also two important factors for a desirable leisure experience. Marilyn proceeded to assess the significance of these six attributes for both museum-visitors and non-visitors. Her findings unveiled a division among art museum visitors into two categories: frequent participants and nonparticipants/occasional participants. Frequent participants, a minority group, visit museums at least three times a year, prioritizing opportunities for learning, relishing new challenges, and engaging in worthwhile leisure activities. For them, museums provide the desired experience they seek. In contrast, nonparticipants lean towards valuing social connections, enjoying active engagement, and feeling at ease in their surroundings. Occasional participants, those who visit once or twice a year, closely resemble nonparticipants in their preferences, prioritizing social interactions, active participation, entertaining experiences, and comfortable settings during their leisure time. Marilyn's research underscores the diversity of values and experiences that individuals seek in their leisure activities, particularly within the context of museum visits. Pierre (1984), delving into a more specialized issue, observed the differences that arise in art museums in the consumption of cultural content based on the income, social class, and educational level of the visitors.

Another research concerns the model by Martine and Eliseo (1989). According to this model, museum visitors are categorized based on their spatial behaviors, which resemble patterns observed in the animal kingdom, from which their names are inspired (Eirini et al., 2017). Thus, four primary types of visitors are identified. First, there are the «ant» type visitors, who are interested in exploring all exhibits. They engage in detailed observation and are open to receiving additional information from museum staff. Regarding their spatial movement, they prefer to avoid empty areas and especially the center of the exhibition halls. Second, there are the «fish» type visitors. These visitors seek to gain a better overall view of the exhibits in each room but do not approach them closely or stop at each one. Unlike the first category, they are not particularly interested in information from museum staff. They prefer to avoid crowded spaces and often visit the center of the exhibition halls to achieve the desired view. Third are the «grasshopper» type visitors. This type is characterized by an interest in specific exhibits, which they approach closely and spend a significant amount of time observing. They already possess a considerable amount of information about the exhibits that interest them. In terms of movement, they choose to traverse the center of the halls to reach the exhibits they are interested in more quickly. Finally, there are the «butterfly» type visitors. These visitors are interested in nearly all the exhibits, allocating varying amounts of time to each one of them. They also pay attention to existing information, such as signs. As they do not have a particular interest in specific exhibits, and consequently, no specific priorities, their way of moving is characterized by continuous changes in direction and maintaining proximity with the exhibits. Due to their autonomous nature, they avoid following museum staff and may change their route suddenly to avoid crowding.

David (1997) further categorized the audience in galleries, indicating the existence of «casual visitors», who swiftly traverse the exhibition space without delving deeply into the exhibits, «cursory visitors», who exhibit greater interest in both the exhibits and the exhibition they are observing, and «study visitors», a smaller group relative to the former two, who pay particular attention to the available information about the exhibits and are willing to invest significant time to learn as much as possible about them.

Howard (1999) took a different approach, focusing on categorizing methods of knowledge transfer to visitors. This distinction is mentioned here because it is closely related to the characteristics of the visitor groups mentioned earlier and their preferred ways of engaging with exhibits. Howard Gardner distinguished the following categories: linguistic (written material), logical-mathematical (diagrams), schemes, spatial (maps), musical (audio, music), bodily (manipulation), interpersonal (social context), and intrapersonal (alone).

Shifting the focus to broader topics, Eilean (1999), similarly to Graham Black later on, delved into categorizing the audience based on more general characteristics. The categories she identified include families, school parties, other organized educational groups, leisure learners, tourists, the elderly, and people with visual, auditory, mobility, or learning disabilities.

Taking research to a different level and perspective, John and Lynn (1992, 2000) developed a theoretical model aimed at exploring visitors' perspectives on the museum experience in three stages: personal, social, and physical. Further research on the subject on their part led to the study mentioned earlier.

Like Pierre (1984), Richard (2005) and Richard & Gabriel (2012) write about a distinction of audiences, based on their social status and the range of engagement they have with arts. Specifically, he categorizes as «omnivores» visitors of high social status, who prefer to indulge in a wide range of cultural experiences and as «univores» those who display a liking for only one or a small number of cultural experiences. Adding to this, he mentions one more distinction, the «highbrow univores», meaning people that exclusively attend elite leisure activities and only prefer the fine arts, avoiding at the same time everything that is considered not elite leisure activity.

Bernice and Dennis (2006) classified museum visitors based on their unique learning styles. Initially, she introduced the «Innovative» group, characterized by their auditory preference and keen interest. They lean towards interpretations that foster social interaction. Following them are the «Analytical» individuals, who favor interpretations rich in facts and structured ideas. Subsequently, we encounter the «Pragmatic» visitors, known for their fondness for experimenting with theories and uncovering knowledge independently. Lastly, Bernice and Dennis highlight the «Experimental» group, who acquire knowledge through imaginative trial and error.

John Falk's later analysis is also very interesting. Through numerous studies in the museum field, he suggests grouping museum visitors based on the driving force behind their visit. Under this framework, his group creation is based on elements that reflect the reasons for visiting a museum, as well as on the descriptions provided by visitors regarding their overall experience (John, 2013). As before, each group has been assigned an iconic name. For instance, the «Explorers» group refers to visitors driven by their curiosity and characterized by a general interest in the museum's content. Their goal is to discover exhibits that pique their interest and fuel the process of learning. Then, there are the «Facilitators» who are motivated by social interaction. Their main objective is to facilitate the learning process of those who visit the museum with them, either in the same group or as part of a team. Next, we have the «Professional/Hobbyists», who feel a connection between the museum's content and their profession or hobbies. Their museum visits are dedicated to satisfying specific knowledge needs. Within this categorization are also found the «Experience Seekers» who perceive the museum as a place of exceptional significance. Their primary motivation for visiting is to experience a specific activity or event within the museum. Finally, there are the «Rechargers» who seek inner reflection and spiritual rejuvenation through their museum visits. They view the museum as a refuge from everyday life or a place where they can affirm their religious beliefs.

In addition to the pretext for the visit and their behavior within the museum, there are other criteria for categorizing museum visitors. These criteria focus on the individual characteristics of the visitors, based on which the visitors are grouped into specific categories. According to Graham (2014), one of the characteristics that distinguishes museum visitors is demographic information, including age, gender, social class, employment status, and education level. Family status, such as whether visitors are couples with or without children, is also included, as it provides valuable information about how visitors interact with the exhibition environment. Furthermore, as science progresses and museums recognize the value of visitors' national origins, this element is also included in the demographic information of contemporary studies. Another approach to categorization is based on social and economic parameters, meaning classification based on employment status and income. Additionally, another way of visitor categorization is based on education (primary school students, middle and high school students, university students), as well as information related directly to the specific interests of certain groups. Adding to the above, psychographic information, such as personal opinions and beliefs, as well as the broader lifestyle and habits of visitors, can also be utilized.

Eda and Axel (2019) conducted a reverse study, but at the same wavelength as Marilyn (1983), exploring who visits art museums and for what reason. Additionally, they delve into the tastes and preferences of the visitors, while also capturing their interaction with a wide range of leisure activities.

From the above brief overview of research, it becomes apparent that there is a plethora of study types related to museum visits, with each type including an equally significant number of studies. Among these, there are general studies that deal with the classification of visitors based on their basic characteristics, while others delve into the segmentation of the audience based on more specialized criteria.

Furthermore, research is conducted on how a visitor learns in the museum, something directly related to the category of the audience to which they belong. Equally important are studies that explore the visitor's perception of the exhibition, their expectations before, during, and after the visit, their interaction with the space and the exhibits, and many others.

It is important to note that the extensive number of research types and their sheer quantity do not make it easy to utilize them for the creation of exhibitions aimed at satisfying the entire spectrum of visitors. Certainly, the application of several theoretical studies will positively contribute to the creation of exhibitions that will be well-received by a larger portion of the audience. However, based on the above, it is practically impossible to satisfy 100% of the visitors, as the combination of elements that each group may find interesting in an exhibition might act as a deterrent for another group.

3. “Augmented” exhibits

In the contemporary museum environment, the application of new technologies is starting to be considered as something self-evident and perhaps expected by museum visitors (Hannah & Mark, 2020). Digital tools, such as Collection Management Systems (CMS), digital repositories, and digital environments like Extended Reality, are just a few of the technological tools used in modern museums. Museum staff utilize these tools to better manage and present the available cultural information to visitors. Aiming to enrich the museum's toolkit in the areas of management, digitization, and highlighting available cultural metadata, the concept of “augmented” metadata exhibits or simply “augmented exhibits” will be analyzed further below.

As an “augmented” exhibit can be characterized any kind of tangible or intangible museum exhibit, whether it is permanent or ephemeral, framed by interpretations, user experiences, expert and non-expert narratives, testimonies (historical and non-historical) and silent biography/unknown historical events. It may be related to other exhibits and/or thematic sections, and it may be a creation of humans and/or machines. To the above are also included characteristics attributed to the exhibits by members of society of any given time, characteristics that were not originally assigned to the exhibits by their creators. Essentially, an “augmented” exhibit can be considered as anything the human mind can conceive.

To clarify the difference between an augmented and a non-augmented exhibit, two hypothetical examples of documentation will be developed. An example that demonstrates their difference can be the hypothetical documentation of an ancient temple. This example was chosen based on the idea that it is not common to document buildings in museum CMS, unlike moveable museum objects. For this example, the temple is located within an archaeological site, and for visitor information, recorded presentations and guided tours with a guide are used, while at many points there are explanatory signs that contain further historical information, possibly accompanied by photos. The aforementioned probably cover the majority of visitors in terms of the volume of information they want to receive. Of course, it should be noted that this cannot be absolute, as the visitor does not have access to all the available information that exists about the specific temple. For example, for the convenience of visitors, specialized information may be omitted, such as the place of origin of the construction materials, dimensions, or historical events related to the temple.

By documenting the temple as an augmented exhibit, all available information related to the monument is offered to the visitor well-organized and formatted. Thus, the visitor has the flexibility to choose the depth of knowledge and the direction they want to follow. For example, a visitor may be more interested in the history of the monument's conservation rather than general historical information. Another visitor may want to deepen their knowledge about the creators of the monument or the factors that have contributed to the formation of the temple's characteristics as it stands at the time of the visit. (e.g., why, and when were two columns moved from the temple's site to the nearby museum? What kind of material replaced them, who made them, etc.).

Assumptions and potential questions cannot be predicted absolutely, but with the help of digital tools like augmented exhibits, all available information can reach the visitor, allowing them to shape their experience as they see fit. Of course, the above suggestions and practices do not negate the possibility of having formal exhibit presentations at the same time, as they exist today, for those who prefer a more directed/typical approach. On the contrary, it is proposed to give the visitor the opportunity, if they wish, to customize at will the structure and content of their experience, at any given time.

As a second example will be discussed the interest that can arise from the presentation of traditional clothing in a small ethnographic museum. This type of exhibit was chosen because of the difficulty in collecting, documenting, and presenting metadata about ethnic garments in a museum context.

These exhibits are often associated with many individuals in different ways and are tied to multiple historical events and meanings, information which may not be presented to the visitor as a whole, as it would be probably overwhelming for the average visitor. Instead, it would possibly be preferable to allow the visitor to be able to choose by themselves what information they prefer to be exposed to. This of course can include metadata in different forms, such as images of different time periods, videos showing the making or wearing of the garment, narratives from people who wore the clothing, etc., rather than being limited to reading a sign while observing the exhibited item (of course, for the different forms of information to be provided, the museum should first document them as well and scientifically tie them to said garments).

The ability of the visitor to delve deeper into the exhibited items information, through access to possible further information in various forms, will bring them closer to its meaning and significance. At the same time, they will be provided with the opportunity to choose the format and size of the information they wish to acquire (for example, they may be mainly interested in oral testimonies). The ability to delve deeper in this way will assist the visitor in gaining a different perspective on the exhibit, making its unique characteristics a central pillar of the experience, rather than focusing on basic attributes such as date and place of origin.

Having in mind the examples above, the documentation of an exhibit as augmented, allows the creation of entities with multiple dimensions (material, immaterial, and digital). These entities will be interconnected with metadata in various forms, such as videos, audio, text, images, oral descriptions, and testimonies, as well as other exhibits. Thus, the term augmented exhibits is proposed as a solution to the challenge of managing the wealth of information contained in museum items.

The challenge mentioned above has been noted in the literature. As Alexandra (2017) states, the requirements for complex and multi-dimensional information cannot be met with the methods available in museums today. According to Alexandra (2017), the information systems used by museums have several limitations, such as the inability to record daily activities, like exhibit maintenance. This results in the loss of significant information regarding not only the exhibits, but the museum as well. Additionally, there is no capability for linking to other exhibits or outside the museum relevant metadata, as the records are limited to gathering information exclusively for each item. Museums today are called upon not only to preserve and reproduce basic information, such as the date of construction and the origin of an item, but also to provide visitors with deeper knowledge.

This article supports Alexandras writings (2017), that an ideal museum CMS should include the entirety of cultural information and provide visitors with substantial knowledge. Furthermore, utilizing various types of information, such as oral usage testimonies, can allow museums to use more tools for information presentation. Specifically, virtual reality devices, tablet applications, and interactive displays are just a few examples of interfaces these new types of metadata can be incorporated. Moreover, in the heritage field generally and in museums specifically (where visitors come into direct contact with cultural exhibits), it has been proven that the combination of various media for the interpretive approach to exhibits contributes to a better understanding of their significance by visitors (Andromachi & Alexandra, 2008). Therefore, the utilization of augmented exhibits is an approach that not only meets the needs of modern museums, but also facilitates interaction between visitors and the displayed material.

4. Conclusions

Based on the aforementioned points, several potential benefits can be identified from the possible adoption of such a digital tool. Firstly, this new centralized but at the same time polymorphic entity provides the possibility of managing and displaying information in ways and in spaces where it was not feasible to be done satisfactorily until now. For example, a visit to an archaeological site can be transformed into a completely different experience, as the visitor will have access to a wide range of information, in various forms. By allowing the visitor to choose the depth of engagement with this material, understanding and participation in available information are enhanced. Furthermore, augmented exhibits can be integrated in various ways into each environment, depending on the museum's needs. For example, the use of visitors' mobile devices has been proven to facilitate access to vast amounts of information within the museum (Maria, 2018). Of course, there are more complex solutions, such as the use of virtual reality technologies, which also contribute to the learning process at all levels of education (Alice et al., 2021).

Beyond enhancing management and presentation techniques, the application of this method can bring significant benefits to the field of research and documentation of monuments. The need for "filling in" the required information in the fields of CMSs, as well as their subsequent interconnection with information from other monuments, will almost certainly generate a series of new long-term research questions arising from the probably hitherto unnoticed or unclear connections between monuments worldwide.

Furthermore, the integration of augmented exhibits can encourage the digitization of information that has been maintained at the local level until now, such as record books, object cards, photos from archives that have not been digitized or linked to the objects they depict, oral testimonies, handwritten texts, etc. The result of this project will be an enriched presentation of monuments and the creation of a broader research framework. Furthermore, based on the definition of augmented exhibits, the search for information that has remained unexplored until now will be encouraged. This will lead to the discovery of hidden aspects of monuments, such as their construction history, acquisition history, and conservation history. The new structure of the information system will allow the analysis of metadata for the exhibits, encouraging the extraction of more information. Thus, through data processing, additional aspects and information that add value to the exhibits will be revealed.

As for visitors, the rich literature examining visitor types and habits suggests that the period during which museums offered the same informational material for all visitor groups seems to be coming to an end. It must also be noted that the theories mentioned in this article are only a small portion of the extensive literature dealing with the issue of visitor classification. Thus, it is almost certain, until proven otherwise, that it is impossible to create an exhibition that caters to everyone's needs and preferences, since it's also impossible to take into consideration the vast number of parameters needed to organize such an exhibition.

Based on what has been mentioned earlier, and considering the capabilities of augmented exhibits, the idea arises that visitors can now have access to the entire available informational material of each exhibit and based on this, shape their experience autonomously. This approach would not replace traditional methods of information provision but would extend them, allowing each visitor to delve as deep as they wish, following the direction they want, depending on their own interests and aspirations. This way, there would be an optimization of information presentation to the public, as the visitor would define parameters such as the volume of information they receive, its order, and the thematic focus of the presented material (deepening into historical, biographical, conservation, typological issues, etc.). All of this, of course, assuming that the informational material is provided in way that it would be easily navigated by the average visitor.

This article proposes the utilization of the concept of augmented exhibits as a strategic approach to museum information management. This approach is expected to provide benefits to both visitors and museum staff. However, further research is required to ascertain the acceptance of this approach by museum visitors and to examine how augmented exhibits can benefit museum visitors. Another essential field of research is evaluating the preference of museum staff for this tool, as well as the practical benefits of its use compared to traditional methods of managing museum information. To implement these proposals, extensive digital modernization of the metadata management process of cultural institutions is required. It also necessitates the digitization of existing, non-digitized material and strengthening efforts towards the creation of linked cultural exhibits, as already applied by some cultural institutions in Greece and abroad.

It should be noted that, while the discussed elements have not yet found full implementation in practical settings, they have undergone thorough analysis in the past for the creation of a CMS "profile" for the Museum of Informatics & Telecommunications of the National and Kapodistrian University of Athens (NKUA) (Charilaos, 2022). Also, quite recently (July 2023) a project regarding the depiction of reach metadata reported on an online conference some interesting results from its pilot study. Despite having some notable attributes, the project doesn't completely fulfil the vision of implementing the augmented exhibits concept mentioned earlier. Hence, it doesn't produce or propose a complete application "profile" for serving augmented metadata within the museum community.

Moving forward, a more robust approach involves developing a pilot profile that incorporates all the unique features of augmented exhibits, within a museum environment. This profile, combined with audience research through questionnaires, could provide a more comprehensive understanding of the acceptance and utility of this approach among both visitors and museum staff. Even on a limited scale, the results of such a survey could emphasize the necessity and/or utility of adopting such an approach in the management and provision of cultural content information. It could also highlight potential additions and improvements.

In summary, the introduction of augmented exhibits into the museum environment is expected to open new horizons in the fields of research, documentation, digitization, and presentation of museum materials, enhancing the understanding of their cultural content by visitors.

References

- Black, G. (2014). *ΤΟ ΕΛΚΥΣΤΙΚΟ ΜΟΥΣΕΙΟ ΜΟΥΣΕΙΑ ΚΑΙ ΕΠΙΣΚΕΠΤΕΣ* (S. Kotidou, Trans.). Αθήνα: ΠΟΛΙΤΙΣΤΙΚΟ ΙΔΡΥΜΑ ΟΜΙΛΟΥ ΠΕΙΡΑΙΩΣ.
- Bounia, A. (2015). *Στα παρασκήνια του μουσείου* (6th ed.). Αθήνα: ΕΚΔΟΣΕΙΣ ΠΑΤΑΚΗ.
- Bourdieu, P. (1984). *Distinction A Social Critique of the Judgement of Taste* (R. Nice, Trans.). Cambridge: Harvard University Press.
- Dean, D. (1997). *Museum Exhibition Theory and Practice*. London: Routledge.
<https://doi.org/10.4324/9780203039366>
- Falk, J. H., & Dierking, L. D. (1992). *THE MUSEUM EXPERIENCE*. WASHINGTON D.C: WHALESBACK BOOKS.
- Falk, J. H., & Dierking, L. D. (2000). *Learning from Museums: Visitor Experiences and the Making of Meaning*. United Kingdom: ALTAMIRA PRESS.
- Falk, J. H. (2013). UNDERSTANDING MUSEUM VISITORS' MOTIVATIONS AND LEARNING. In I. B. Lundgaard & J. T. Jensen (Eds.), *Museums: Social Learning Spaces and Knowledge Producing Processes* (pp. 106–133). STYRELSEN DANISH AGENCY FOR CULTURE.
https://issuu.com/kunststyrelsen/docs/museums._social_learning
- Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York City: Basic Books.
- Gkazi, A., & Nikiforidou, A. (2008). Η ΧΡΗΣΗ ΤΩΝ ΝΕΩΝ ΤΕΧΝΟΛΟΓΙΩΝ ΣΤΙΣ ΕΚΘΕΣΕΙΣ ΜΟΥΣΕΙΩΝ: ΕΝΑ ΜΕΣΟΝ ΕΡΜΗΝΕΙΑΣ. In A. Bounia, N. Nikonanou & M. Ikonou (Eds.), *Η ΤΕΧΝΟΛΟΓΙΑ ΣΤΗΝ ΥΠΗΡΕΣΙΑ ΤΗΣ ΠΟΛΙΤΙΣΜΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ: ΔΙΑΧΕΙΡΙΣΗ, ΕΚΠΑΙΔΕΥΣΗ, ΕΠΙΚΟΙΝΩΝΙΑ* (pp. 373–384). ΑΘΗΝΑ: ΕΚΔΟΣΕΙΣ ΚΑΛΕΙΔΟΣΚΟΠΙΟ.
- Gürel, E., & Nielsen, A. (2019). Art Museum Segments: Evidence From Italy on Omnivores and Highbrow Univores. *International Journal of Arts Management*, 21(2), 55–69.
<https://www.jstor.org/stable/45221715>
- Hood, M. G. (1983). Staying away: Why people choose not to visit museums. *Museum News*, 61(4), 50–57.
- Hooper-Greenhill, E. (1999). *The educational role of the museum* (2nd ed.). United Kingdom: Routledge.
- Katsigiannis-Ippikoglou, C. (2022). *Ζητήματα στην ψηφιακή τεκμηρίωση και διασύνδεση «επαυξημένων» τεκμηρίων σε Συστήματα Διαχείρισης Συλλογών: το περιεχόμενο του Μουσείου Πληροφορικής & Τηλεπικοινωνιών του ΕΚΠΑ*. (Publication No.3074499). [Master's Dissertation, National and Kapodistrian University of Athens]. ΠΕΡΓΑΜΟΣ. <https://pergamos.lib.uoa.gr/uoa/dl/object/3074499#fields>
- Levasseur, M., & Véron, E. (1989). *Ethnographie de l'exposition: l'espace, le corps et le sens*. Paris: Bibliothèque Publied' Information.
- McCarthy, B., & McCarthy, D. (2006). *Teaching Around the 4MAT® Cycle: Designing Instruction for Diverse Learners with Diverse Learning Styles*. California: CORWIN PRESS.
- Peterson, R. A. (2005). Problems in comparative research: The example of omnivorousness. *Poetics*, 33(5-6), 257–282. <https://doi.org/10.1016/j.poetic.2005.10.002>
- Peterson, R. A., & Rossman, G. (2012). Changing arts audiences: Capitalizing on omnivorousness. In J. Steven & B. Ivey (Eds.). *Engaging Art: The Next Great Transformation of America's Cultural Life* (pp 307–342). <https://doi.org/10.4324/9780203927502>
- Roffi, A., Cuomo, S., & Ranieri, M. (2021). Using Augmented and Virtual Reality for teaching scientific disciplines. *IUL Research*, 2(3), 190–206. <https://doi.org/10.57568/iulres.v2i3.120>
- Roussou, M., & Katifori, A. (2018). Flow, Staging, Wayfinding, Personalization: Evaluating User Experience with Mobile Museum Narratives. *Multimodal Technologies and Interaction*, 2(2), 1–32.
<https://doi.org/10.3390/mti2020032>
- Rushton, H., & Schnabel, M. A. (2020). Exhibiting Digital Heritage. In D. Holzer, W. Nakapan, A. Globa, & I. Koh (Eds.), *RE: Anthropocene, Design in the Age of Humans*. Proceedings of the 25th International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA) 2020 Vol. 2 (pp. 193-202). <https://doi.org/10.52842/conf.caadria.2020.2.193>
- Tsiropoulou, E. E., Thanou, A., & Papavassiliou, S. (2017). Quality of Experience-based museum touring: a human in the loop approach. *Social Network Analysis and Mining*, 7(1), 1–31.
<https://doi.org/10.1007/s13278-017-0453-2>
- Tzortzi, K. (2018). *Ο ΧΩΡΟΣ ΣΤΟ ΜΟΥΣΕΙΟ. Η ΑΡΧΙΤΕΚΤΟΝΙΚΗ ΣΥΝΑΝΤΑ ΤΗ ΜΟΥΣΕΙΟΛΟΓΙΑ*. ΑΘΗΝΑ: ΠΟΛΙΤΙΣΤΙΚΟ ΙΔΡΥΜΑ ΟΜΙΛΟΥ ΠΕΙΡΑΙΩΣ.