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Media and Information Literacy and Immersive Representations of Urban Heritage: A Critical Analysis of the Series Roman Engineering from the MIL-UNESCO Framework

Alfabetización mediática y representación inmersiva del patrimonio urbano: análisis crítico de la serie Ingeniería romana desde el marco MIL-UNESCO

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Abstract

This article analyzes the documentary series Ingeniería romana (RTVE, 2015) within the framework of Media and Information Literacy (MIL-UNESCO), with the aim of examining how immersive technologies—360° video, augmented reality, and virtual reconstructions—mediate the representation of Roman architectural heritage in Mediterranean urban contexts, and what implications this has for the development of audiences' critical literacies. The **methodology** adopts a qualitative and multimodal approach based on audiovisual discourse analysis, sensory analysis (visual, auditory, and kinesthetic), and theoretical contrast with key concepts such as relational authenticity, mediaturistification, and heritage performativity, without resorting to empirical reception data. The **results** show that the series constructs a sensorially intense didactic experience that positions the viewer as an active user through the illusion of presence, non-linear navigability, and the superimposition of temporal layers. However, from an MIL perspective, this strategy generates significant tensions, such as the prioritization of immersion over historical complexity, the invisibilization of conflicting social narratives, and the dependence on technological infrastructures that limit accessibility. The **conclusions** emphasize that immersive technologies do not, in themselves, constitute tools for media literacy; rather, they require criteria of epistemological transparency, narrative diversity, and inclusive design to foster critical cultural citizenship. The **study's original contribution** lies in proposing a reading of immersive heritage as an informational mediation device, situating it within the debate on MIL urban ecosystems and cognitive justice in contemporary digital culture.

Resumen

Este artículo analiza la serie documental Ingeniería romana (RTVE, 2015) desde el marco de la Alfabetización Mediática e Informacional (MIL-UNESCO), con el **propósito** de examinar cómo las tecnologías inmersivas —video 360°, realidad aumentada y reconstrucciones virtuales— median la representación del patrimonio arquitectónico romano en contextos urbanos mediterráneos y qué implicaciones tienen para el desarrollo de competencias críticas en las audiencias. La **metodología** adopta un enfoque cualitativo y multimodal, basado en el análisis del discurso audiovisual, el análisis sensorial (visual, auditivo y cinestésico) y la contrastación teórica con conceptos clave como autenticidad relacional, mediaturistificación y performatividad patrimonial, sin recurrir a datos empíricos de recepción. Los **resultados** muestran que la serie construye una experiencia didáctica sensorialmente intensa que posiciona al espectador como usuario activo mediante la ilusión de presencia, la navegabilidad no lineal y la superposición de capas temporales; sin embargo, desde una perspectiva MIL, esta estrategia genera tensiones relevantes, como la priorización de la inmersión sobre la complejidad histórica, la invisibilización de relatos sociales conflictivos y la dependencia de infraestructuras tecnológicas que limitan la accesibilidad. Las **conclusiones** subrayan que las tecnologías inmersivas no constituyen por sí mismas herramientas de alfabetización mediática, sino que requieren criterios de transparencia epistemológica, diversidad narrativa y diseño inclusivo para favorecer una ciudadanía cultural crítica. La **aportación original** del estudio reside en proponer una lectura del patrimonio inmersivo como dispositivo de mediación informacional, situándolo en el debate sobre los ecosistemas urbanos MIL y la justicia cognitiva en la cultura digital contemporánea.

Keywords

Media and Information Literacy; urban cultural heritage; immersive technologies; audiovisual documentary; heritage representation; digital accessibility

Palabras clave

Alfabetización mediática e informacional; patrimonio cultural urbano; tecnologías inmersivas; documental audiovisual; representación del patrimonio; accesibilidad digital

1. Introduction: Relationships between Audiences and Heritage in the Immersive Media Era: Experiential Intensification and Cultural Commodification

Over the past two decades, research on cultural heritage and digital media has been increasingly focusing on the analysis of immersive technologies such as 360° video, augmented reality and virtual reconstructions as mechanisms capable of transforming how we access, perceive and experience the past. In this field of research, a significant number of studies have explored the experiential, didactic and promotional dimensions of these technologies, especially in relation to heritage dissemination and cultural tourism. However, this emphasis has left little room for critical analysis of the discursive, epistemological and political implications associated with the immersive mediation of cultural heritage, particularly with regard to processes of selection, hierarchical organisation and naturalisation of historical knowledge. The consolidation of immersive media has profoundly reconfigured contemporary models of heritage representation, shifting the paradigm from passive observation towards interactive, distributed and multi-sensory forms of participation. In this context, the heritage documentary can be understood as a strategic mediator between academic knowledge, mass communication and the everyday cultural experience of audiences, especially in urban locations affected by tourism dynamics. From the perspective of Media and Information Literacy (MIL), these audiovisual products operate not just as instruments for representing the past but as cultural devices that actively shape how we access, interpret and critically evaluate mediated historical narratives. In terms that draw on a broader tradition of the concept, Buckingham (2020) argues that media literacy requires a structured approach to media education that is concerned with critical thinking rather than being limited merely to the functional mastery of digital hardware and software (p. 235). From the critical perspective of heritage studies, Smith (2006) suggests that heritage does not refer solely to the stability of cultural values and meanings, but also involves processes of changing, negotiating and reformulating identities. It should therefore be understood not as a neutral or transparent reality but as a discursive and socially disputed construction (p. 4). In this context, the series *Ingeniería romana* (RTVE, 2015), created and directed by José Antonio Muñiz and presented by the engineer and historian Isaac Moreno Gallo, is considered here as a case study of special relevance for the analysis of the contemporary transformations to the mediated representation of cultural heritage. The series articulates an exploration of Roman settlements—such as Tarragona, Rome, Nîmes, Cartagena and Sagunt—by means of a narrative architecture that combines a conventional documentary format with immersive elements to establish an audiovisual coexistence of past and present that reconfigures the relationship between image, space and historical knowledge. The integration of immersive 360° microdocumentaries into linear episodes operates both as a means of intensifying the viewer's perception and as a mediation strategy that organises the experience of heritage in terms of presence, spatial orientation and agency. In the context of immersive VR, Slater (2009) describes presence as a feeling of "being there", i.e., a sensation of being in a real place, a concept that is especially useful for defining the type of effect that these productions aim to have on viewer perception (p. 3549). This design is reinforced by the placement of the presenter at the actual site of the archaeological ruins, so that his physical presence can serve to sustain the continuity between body, urban space and historical narrative, legitimising the transition between material evidence and digital reconstruction (see Figure 1).

Figure 1. Isaac Moreno Gallo interacting with the ruins of the Roman Theatre of Cartagena



Source: *Ingeniería romana* (RTVE, 2015), RTVE Play

Moving far beyond the scientific communication or tourism promotion format, this narrative and technological strategy raises a key question for research related to the extent to which immersive cultural heritage experiences foster a critical and participatory appropriation of urban cultural memory, or conversely, contribute to processes of spectacularisation, simplification and commodification of the past. The existing literature offers complementary and conflicting answers to this question. While some studies highlight the cognitive and affective potential of spatial immersion to enhance engagement and historical learning (Nash, 2012), others warn of the risks associated with decontextualised spectacularisation and a reduction of historical complexity as a result of visually impressive but epistemologically impoverished experiences (Belting, 2004). Drawing on these debates, this article adopts an interdisciplinary perspective that articulates three interrelated dimensions. Firstly, it examines the tension between material authenticity and digital reconstruction in immersive cultural heritage narratives. Secondly, it analyses how media technologies reconfigure contemporary patterns of heritage consumption in urban contexts and tourist sites. Thirdly, it explores the performative construction of the viewer, who is understood not as a passive receiver but as a subject whose sensory and cognitive engagement is articulated around specific narrative and technological decisions. From the perspective of Media and Information Literacy, this approach facilitates an exploration of immersive media production as both a pedagogical opportunity and a space for cultural negotiation. In this sense, the article interrogates the extent to which immersive representations of cultural heritage effectively contribute to the development of critical skills in audiences, or conversely, reinforce forms of spectacularised consumption of the past that hinder viewer comprehension of its historical and social complexity. This question is explored through an analysis of the series *Ingeniería romana* (RTVE, 2015), examining its representation strategies in light of the UNESCO MIL theoretical framework.

1.1. Objectives

The aim of this article is to examine the immersive representation of ancient Roman architectural heritage in the series *Ingeniería romana* (RTVE, 2015) through the analysis of its eight episodes and five immersive 360° videos, considering its discursive and epistemological effects from the perspective of Media and Information Literacy (UNESCO MIL). More precisely, the study focuses exclusively on the analysis of the hybrid sequences in the corpus, for the purpose of examining how they articulate the representation of the heritage sites, the construction of the historical narrative and the participation of the viewer, considering their potential to allow the viewer to access, interpret and critically evaluate the mediated historical content. To this end, the study attempts to answer the following research questions: (1) How do specific narrative and technological decisions articulate the immersive experience? (2) What models of historical knowledge and viewer participation do these decisions produce? (3) To what extent do these mediations contribute to the development of a critical reception, or conversely, to processes of spectacularisation and commodification of the past? In keeping with the qualitative and interpretative nature of the study, these questions serve only to guide the analysis and are not intended as contrast hypotheses.

2. Theoretical Framework: Media Literacy and Immersive Heritage Representation

2.1. Immersive Technologies and the Enhancement of the Experience of Cultural Heritage

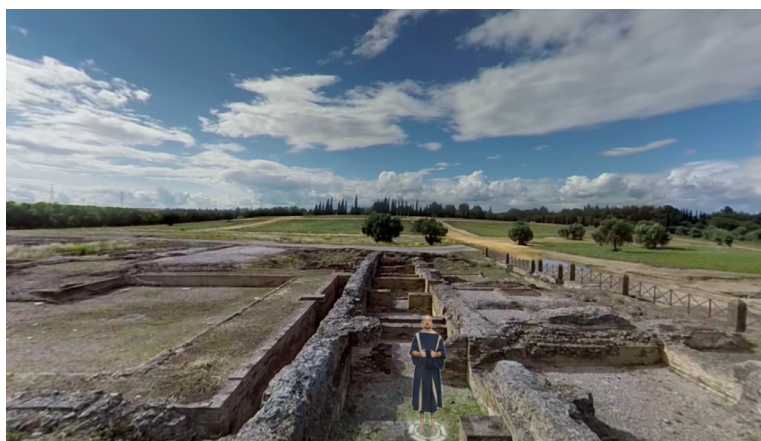
Much recent research on cultural heritage and digital media has tended to conceptualise immersive technologies as devices aimed at intensifying our experience of the past and expanding our access to historical knowledge. From this perspective, resources such as 360° video, augmented reality and virtual reconstructions can reinforce the audience's sense of presence, encouraging their emotional

engagement and contributing to symbolic (and in many cases economic) enhancement of heritage sites, especially in urban contexts affected by dynamics of touristification. This line of research highlights the ability of immersive media to update traditional formats used to disseminate our cultural heritage, boost their communicative appeal and adapt them to the cultural consumption habits of contemporary audiences. The immersive experience has thus become associated with the promise of democratisation of access to cultural heritage, as it facilitates spatial understanding, historical empathy and subjective appropriation of cultural assets. However, this emphasis on the experience tends to conceive of technological mediation as a transparent medium, without fully taking into account the discursive operations involved in the construction of the image of the past offered to audiences.

2.2. Critical Perspectives: Mediation, Spectacularisation and the Construction of the Past

In opposition to these laudatory approaches, several critical perspectives problematise the discursive and epistemological effects of immersive heritage mediation. From such perspectives, instead of being understood as neutral, sensory intensification and the logic of the immersive experience are viewed as potentially associated with processes of narrative simplification, historical decontextualisation and ideological naturalisation of the past, as they prioritise visual cohesion and spectacular imagery over the complexity, controversy and uncertainty inherent in all historical knowledge. Immersive technologies not only mediate access to cultural heritage but also actively participate in the production of regimes of visibility that prioritise certain narratives while rendering others invisible and constructing specific relationships between image, memory and cultural power. In this respect, the coexistence of physical and digital elements in heritage representations gives rise to hybrid experiences that require specific Media and Information Literacy skills to be able to distinguish between archaeological evidence, plausible reconstruction and narrative interpretation. This tension between experience, mediation and critical thinking is key to the evaluation of the role of immersive media in the development of a culturally informed public in the accordance with the MIL Cities framework. This issue is particularly evident in representations that integrate virtual figures into real archaeological sites, such as in the immersive video *Termas Mayores de Itálica*, where a virtual character is inserted into the site of excavated Roman baths, and where a digital model superimposed over the image of the ruins could be interpreted as historical continuity if the reconstruction criteria used are not made explicit (see Figure 2).

Figure 2. Virtual reconstruction of a Roman character in the immersive video *Termas Mayores of Itálica*



Source: *Ingeniería romana* (RTVE, 2015), RTVE Play

2.3. Media and Information Literacy and Mediated Heritage: A Research Gap

Although both the experiential and critical approaches described above have made key contributions to our understanding of the impact of immersive media on the representation of cultural heritage, very few studies have explored them from the perspective of Media and Information Literacy. This research gap is all the more remarkable considering the fact that scholars in this field have traditionally stressed that practical access to the media is insufficient to ensure media literacy. Livingstone (2004), for example, defines media literacy as the ability to access, analyse, evaluate and create messages in different formats (p. 3), while Hobbs (2010) characterises it as a set of skills needed for full participation in an intensely mediated information society (p. vii). In particular, very little attention has been given to how immersive heritage narratives not only shape cultural consumption experiences but also condition the potential development of critical skills associated with interpreting, evaluating and contextualising mediated historical knowledge. The gap is especially significant in the context of cultural heritage

documentaries, where the authority of the communicative discourse tends to naturalise its own technological mediations. The tension between material evidence, digital reconstruction and narrative interpretation is particularly clear in hybrid representations that combine real-world archaeological sites with digitally generated virtual figures, which requires specific Media and Information Literacy skills to be read critically. Based on this theoretical framework, the following section outlines the methodology used to analyse these hybrid mediations in the documentary series *Ingeniería romana*.

3. Methodology

3.1. Methodological Approach and Research Design

This study adopts a qualitative approach, using discourse analysis to examine how audiovisual narratives about cultural heritage articulate relationships between technology, historical representation and viewer positioning. The research design involves a qualitative case study with an interpretive focus to explore the mediated and constructed nature of immersive experiences, considering not only their formal and technological dimensions but also their epistemological and cultural implications, in line with the UNESCO Media and Information Literacy (MIL) framework. In this sense, the aim of the analysis is not to evaluate the historical accuracy of the digital reconstructions but to examine how the regimes of visibility of the past and the forms of participation offered to audiences are discursively constructed. The methodological design is thus conceived of as an interpretive device that will facilitate the identification of tensions between archaeological evidence, plausible reconstruction and narrative interpretation in contexts of immersive mediation.

3.2. Corpus Selection

The research corpus consists of the content of the series *Ingeniería romana* (RTVE, 2015), conceived of as a transmedia project that combines conventional documentary episodes with immersive 360° videos. This corpus meets three main selection criteria. The first is that it is a production by a public broadcaster that explicitly articulates informational, educational and promotional objectives in relation to cultural heritage. The second is that it systematically integrates immersive technologies into the representation of real archaeological sites, making it a particularly suitable case for analysing hybrid heritage experiences. And the third is that its distribution on open access digital platforms qualifies it as a product operating within the contemporary dynamics of mediated cultural and tourism consumption. The analysis included the whole series, consisting of eight episodes each approximately 55 minutes long (*Ciudades I*, *Acueductos I*, *Ciudades II*, *Acueductos II*, *Carreteras*, *Minería*, *Estructuras* and *Levantando un imperio*), as well as five immersive 360° videos available on RTVE PLAY (<https://www.rtve.es/play/videos/ingenieria-romana/>), each between two and three minutes in duration: *Foro de Caesar Augusta*, *El templo foro de Ampurias*, *Así luchaban los gladiadores romanos*, *Termas Mayores de Itálica* and *Teatro Romano de Cartagena*. The corpus was consulted in March 2026. Hybrid sequences constitute the units of analysis. For the purposes of the study, "hybrid sequence" means any audiovisual unit that combines real archaeological ruins with at least one digital element involving a reconstruction, augmented reality, or virtual model or figure. The analysis focuses specifically on these sequences, as it is in such segments that the discursive tensions that this study is concerned with appear most clearly.

3.3. Analytical Procedure and Scope of Study

The analytical procedure is articulated around a qualitative and comparative examination of the narrative, visual and spatial strategies that structure the immersive experience offered by the series. Particular attention is given to the relationship between image, space and historical narrative, and to the mechanisms of physical anchoring, viewer agency and naturalisation of heritage discourse. These dimensions guided the identification, description and interpretation of the evidence selected in each sequence. The procedure followed four steps: (1) viewing the eight episodes of the series and the five immersive 360° videos in their entirety; (2) segmenting the material by identifying the segments that qualified as hybrid sequences as defined in the previous section; (3) conducting a qualitative comparative analysis of the selected sequences with attention to the dimensions indicated above; and (4) summarising the findings based on the recurrence of discursive tensions related to the representation of the past, the participation of the viewer and the discursive and media conditions that shape the immersive heritage experience. These dimensions are analysed in light of the principles of Media and Information Literacy, considering their potential to foster or constrain the development of the viewer's critical skills. It is important to stress that this study does not aim to provide a comprehensive assessment of the whole production or to make statistical generalisations; nor does it seek to offer an empirical study of viewer reception or to measure the impact of the series on real audiences. Instead the analysis focuses exclusively on the discursive and technical conditions that shape the immersive experience. This narrow focus allows for a more in-depth qualitative examination of the case, while acknowledging the limited scope of the study and avoiding unjustified extrapolations.

4. Analysis and Results

The findings are set out below, organised under four basic categories: the construction of spatial immersion; the representation of everyday life; mapping devices; and technological hybridisation. Each category is illustrated with specific examples taken from the corpus' hybrid sequences, i.e., sequences combining physical ruins, digital reconstructions, virtual figures, animated maps and immersive navigation.

4.1. Spatial Immersion and the Construction of an Experience of Presence

The series *Ingeniería romana* combines two forms of spatial immersion. In the eight linear episodes, the presenter, Isaac Moreno Gallo, is physically located at the archaeological sites, establishing a physical continuity between the material present and the historical explanation. His interaction with the ruins—pointing out walls, walking on pavements and touching structures—functions as a visual anchor that connects the technical discourse to the materiality of the site (Figure 1). Meanwhile, the five immersive 360° videos dispense with the figure of the presenter and instead place the viewer in a central position within the reconstructed space, allowing us to explore it visually by rotating the screen or moving the device. In the 360° videos, the documentary image ceases to function as a fixed backdrop and instead becomes a navigable environment. The user can turn the view in any direction, simultaneously exploring both the real archaeological site and the superimposed digital elements. This combination is especially noticeable in the video *Teatro Romano de Cartagena*, in which the viewer is able to observe the ruins as they are today, the digital reconstruction of the theatre and a virtual figure that moves around the space (Figure 3). The interface does not include any markers to guide the viewer to look at specific points of interest; instead, it is entirely up to us to decide how to explore the space. In the linear episodes, the immersive experience is constructed by the presenter's movements and the occasional integration of animated graphics that superimpose virtual reconstructions over the real image. Conversely, in the 360° videos the absence of a mediating figure and the freedom of orientation create a structure of non-linear navigability that differs substantially from the guided narrative continuity that characterises the conventional documentary format. The implications of these findings for the construction of the heritage experience and the viewer's Media and Information Literacy skills are analysed below in the Discussion section.

Figure 3. Virtual figure integrated into the Roman Theatre of Cartagena



Source: *Ingeniería romana* (RTVE, 2015), RTVE Play

4.2. Figurative Reconstruction, Everyday Life and the Naturalisation of the Past

Scenes of everyday life in ancient Rome are integrated into *Ingeniería romana* using two main techniques: digitally generated virtual human figures and dramatised live-action sequences with real actors. Both techniques are marked by an aesthetic of visual verisimilitude with respect to the clothing, objects and setting shown, in an effort to reflect social practices and customs associated with the cultural heritage sites depicted. The virtual figures include Roman citizens, scribes and workers inserted into reconstructions of urban or working environments. For example, in the immersive video *Termas Mayores de Itálica*, a virtual figure moves around the reconstructed space of the ancient Roman baths (Figure 2). The scenes with real actors are found mainly in the linear episodes. In *Ciudades I*, a dramatised sequence shows a male character in Roman clothing writing on a scroll, surrounded by visual elements that construct a scene depicting a scribe's daily activity (Figure 4). The series does not include any discourse markers (such as on-screen captions, voice-overs or graphic elements) to render explicit the hypothetical nature of the clothing, actions or setting depicted. The recurrence of sequences like this one reveals two patterns in the portrayal of everyday life: (1) a thematic selection focusing on social roles of prestige or of relevance to the technical narrative (scribes, citizens, workers),

and; (2) a systematic absence of references to historically documented practices that might offer a less positive picture, such as slavery, unequal access to literacy or the social hierarchies that existed in Roman cities. This pattern is evident both in scenes with virtual figures and in dramatisations featuring real actors. The implications of these findings for Media and Information Literacy are analysed below in the Discussion section.

Figure 4. Dramatised scene of writing in everyday life in ancient Rome



Source: *Ingeniería romana* (RTVE, 2015), RTVE Play

4.3. Animated Maps, Spatial Hierarchy and Cultural Accessibility

In the linear episodes of *Ingeniería romana*, the heritage sites are located and hierarchically organised by means of three recurrent visual resources: animated maps, place name captions and superimposed photographs. The animated maps appear in transitions and explanatory segments, showing the routes of roads, the location of cities or the expanse of the Roman Empire. Superimposed on these maps are captions with place names and occasional photographs of the archaeological ruins. This visual combination allows the viewer to identify the relationship between the geographical location and the current state of the settlement. A paradigmatic example of such a sequence can be found in *Ciudades II*, where an animated map of the eastern Mediterranean uses a caption to indicate the location of Ephesus, with a photograph of the site superimposed over the map (Figure 5). These images also include construction drawings, layouts and technical diagrams superimposed over the real image of the presenter or of the ruins. These elements do not belong to the diegetic world of the series; instead, they function as external visual instructions that direct the viewer's attention to specific aspects of the explanation. The immersive 360° videos do not contain any visual strategies like these. The user navigates around the space exclusively by moving the device or cursor, without captions, maps or superimposed images guiding the exploration. The implications of these findings for the accessibility and use of the immersive heritage experiences are analysed below in the Discussion section.

Figure 5. Animated map of Roman cities indicated with captions and a superimposed photograph of Ephesus



Source: *Ingeniería romana* (RTVE, 2015), RTVE Play

4.4. The Hybrid Experience and MIL skills

The corpus analysed presents a systematic combination of physical elements (archaeological ruins, the presenter, real landscapes) and digital elements (virtual reconstructions, animated human figures, maps, diagrams). The construction of this hybrid composition varies depending on the format. In the linear episodes, digital layers are superimposed over the real image by means of on-screen graphic insertions. For example, *Ciudades I* features a digital reconstruction of an ancient Roman public square superimposed over an empty plot of land, with animated virtual figures moving around in the reconstructed space (Figure 6).

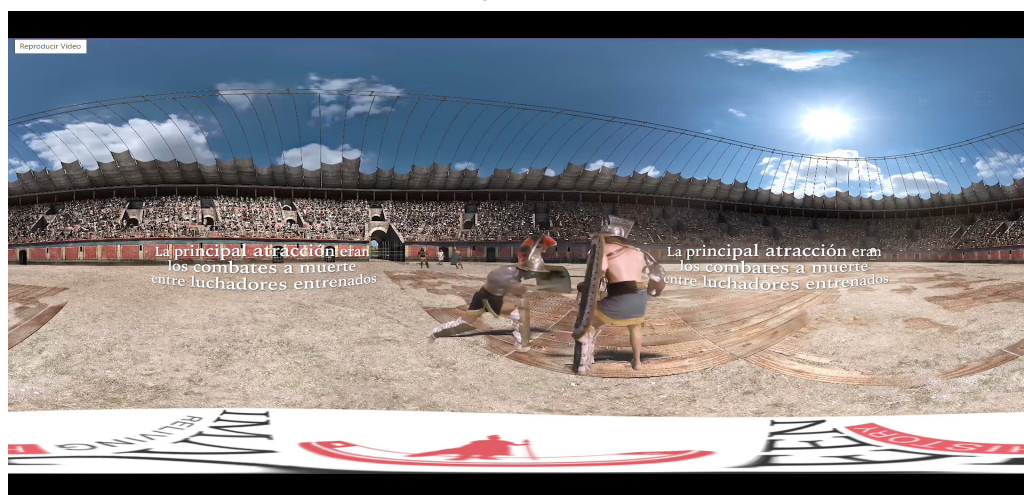
Figure 6. Virtual reconstruction of a Roman public square with a digital crowd



Source: *Ingeniería romana* (RTVE, 2015), RTVE Play

In these cases, the resulting image simultaneously combines the current state of the site, the hypothesised reconstruction and the portrayal of social customs. In the immersive 360° videos, the hybrid effect is experienced from a viewer-centred point of view. The video *Así luchaban los gladiadores romanos* shows a Roman circus with virtual figures of gladiators and an audience, without any graphic elements visually separating the real site from the reconstructed one (Figure 7).

Figure 7. Immersive reconstruction of a gladiator show in a Roman circus, in the 360° video *Así luchaban los gladiadores romanos*



Source: *Ingeniería romana* (RTVE, 2015), RTVE Play

In *Termas Mayores de Itálica*, a virtual figure moves around the baths next to the real ruins, in a reconstruction whose degree of certainty is not made explicit by the interface. In all cases, the series include no explicit discourse markers (on-screen titles, differentiated voice-over, captions) to enable the viewer to distinguish between archaeological evidence, hypothesised reconstructions and narrative interpretations. These findings—articulated around spatial immersion, representations of everyday life, maps and hybrid technology—show recurrent patterns in their mediation of the past, which are discussed in light of the Media and Information Literacy framework in the following section.

5. Emerging Technologies and Informational Heritage Mediation from a UNESCO MIL Perspective

5.1. Between Experiential Intensification and Spectacularisation

The findings of this study confirm that the series *Ingeniería romana* articulates an immersive experience based on the combination of real archaeological ruins, digital reconstructions and virtual figures, as well as a non-linear navigability structure in the 360° videos that complement the linear episodes. This strategy is characteristic of a line of productions that reflect the potential of immersive media to intensify the viewer's cognitive and affective engagement (Nash, 2012) by creating a sense of presence that expands our perceptual access to heritage sites. However, from a critical perspective, this kind of intensification is not epistemologically neutral. As Belting (2004) points out, visual spectacularisation runs the risk of prioritising aesthetic cohesion over historical complexity. In the case analysed here, visual hyperreality (characterised by restored sites, homogeneous lighting and the absence of any signs of deterioration or conflict) tends to offer an image of ancient Rome as a harmoniously functioning cultural system while attenuating its material and social dimensions. This tension between relational authenticity and visual verisimilitude (Huvila, 2023) is especially clear in hybrid sequences that combine physical ruins and digital reconstructions without any discourse markers explaining the degree of certainty of each element. The absence of epistemological metadata—such as visual or auditory indicators that differentiate archaeological evidence, hypothesised reconstructions and narrative interpretations—transforms the immersive experience into a device that is certainly pedagogically effective, but that may be misread as a transparent representation of the past. Thus, immersion does not in itself guarantee a critical understanding of the past if it is not designed in a way that explicitly identifies the limits of certainty and the narrative conventions employed.

5.2. MIL Skills and Constructing Cultural Citizenship in Immersive Environments

According to the Media and Information Literacy (UNESCO MIL) framework, the hybrid heritage experience requires specific skills to distinguish between archaeological data, plausible reconstructions and mediated historical narratives (Livingstone, 2004; Hobbs, 2010). In the series *Ingeniería romana*, the composition of superimposed layers—real ruins, virtual figures, technical diagrams and animated maps—constructs a potential learning space, but it also raises questions about the conditions that foster critical reception. The series offers the viewer a form of agency based on the free navigability in the 360° videos and the presence of the presenter as a guide in the linear episodes. However, this agency is contingent and uneven. On the one hand, the absence of discourse markers to clarify the hypothetical nature of the reconstructions limits the user's ability to critically evaluate the depictions. On the other, the recurrent thematic selection—focusing on prestigious social roles and a narrative of technological progress—renders other historically documented dimensions (such as slavery, unequal access to literacy, and the social hierarchies of Roman cities) completely invisible. These omissions, evident both in the virtual figures and in the dramatisations, reduce the potential for the representation of cultural heritage to serve as a space for pluralistic memory and democratic debate (Smith, 2006). From a MIL perspective, epistemological transparency—understood as the explicit statement of the criteria adopted for selection, reconstruction and interpretation—is essential for the immersive experience to contribute to the formation of culturally informed citizens. In this sense, the series illustrates both the opportunities offered and the risks posed by immersive mediation: It can enhance access and engagement, but it can also naturalise an unproblematised version of the past unless it is accompanied by pedagogical strategies oriented towards fostering critical reflection.

5.3. Accessibility, the Digital Divide and Inclusive Design in Urban MIL Ecosystems

An analysis of the material conditions of digital access reveals a second structural tension. The immersive experience in *Ingeniería romana* requires a stable internet connection, compatible devices and preexisting digital skills to navigate the visuals using a mouse or touch screen. This technological requirement is not neutral, as it implicitly assumes an idealised user profile—urban, young, with technical and cultural capital—to the exclusion of the elderly, the disabled, rural communities and migrant groups (Van Dijk, 2020; Pérez-Medina & Sánchez-Mesa, 2023). This asymmetry aligns with warnings in the scholarly literature about the digital divide and cognitive justice (Chibás, 2024). In the context of the MIL Cities model (Grizzle et al., 2021; Chibás et al., 2020), critical participation in mediated heritage experiences cannot depend exclusively on technological infrastructure; inclusive design policies are also needed. In this regard, this analysis points to the following operational guidelines: (a) incorporate low-threshold

technological alternatives (2D versions, downloadable audio guides); (b) ensure compliance with digital accessibility standards (WCAG 2.1); and (c) coordinate cultural mediation programs that can accompany immersive experiences, offering interpretative keys and critical contextualisation. These measures should be understood as structural components of equity-oriented heritage mediation rather than mere peripheral adaptations. In line with points 4, 12 and 13 of the MIL Cities model, the integration of Media and Information Literacy criteria into the design of immersive experiences is essential to transform the promise of cultural democratisation into an effective and non-exclusive reality.

5.4. Limitations, Ethical Considerations and Implications for Urban MIL Ecosystems

This study has two main limitations that need to be taken into account to properly contextualise the scope of its findings. The first is that it is based on a discursive multimodal approach focusing on the analysis of a media design and does not incorporate empirical data on viewer reception that could facilitate the evaluation of how audiences effectively interpret and negotiate these experiences. And the second is that its character as a case study prevents systematic comparisons with other immersive heritage productions, which means that the conclusions should be understood as situated and exploratory. Far from precluding the possibility of further research, these limitations open up new avenues for investigation. In particular, there is a clear need to develop empirical studies of user reception with diverse audiences to compare the real effects of these proposals, to pursue comparative analysis of cultural heritage contexts outside Europe, where the relationships between technology, memory and representation may be configured differently, and to design specific metrics for Media and Information Literacy applicable to the heritage field, incorporating variables such as the visibility of epistemological metadata and the degree of narrative diversity.

6. Conclusions

This analysis of *ingeniería romana* from the perspective of Media and Information Literacy points to five conclusions that reflect both the potential and the shortcomings of immersive experiences related to cultural heritage. First of all, these technologies are not intrinsically educational, as their ability to encourage a critical reading depends on the implementation of mediation strategies that expose the constructed nature of the historical narrative and ensure adequate epistemological transparency. In the case analysed here, the absence of discourse markers to help viewers distinguish between archaeological evidence, hypothesised reconstructions and narrative interpretations significantly restricts the critical reception of the content. Moreover, the immersive experience is articulated around a promise of agency that in reality is clearly conditioned. Although navigability in 360° environments and superimposed visual layers intensify sensory engagement, these modes require digital skills and technological resources that are not available to everyone in an equitable manner. In addition, the tendency to naturalise hyperreality, along with the preference for uncontroversial narratives, limits the development of the critical skills that characterise MIL. The repeated construction of a purely positive image of life in ancient Roman tends to obscure historically documented dimensions such as slavery, inequality and social hierarchies, thereby reducing the potential of cultural heritage dissemination to serve as a space for pluralistic memory and debate. Furthermore, the effective incorporation of MIL criteria into the design of immersive heritage experiences requires the promotion of active public policies, and to this end it is essential to integrate standards of accessibility, interpretative transparency and narrative diversity in the assessment and funding processes for digital heritage projects. Finally, in relation to future lines of research, this study—which focuses on the discourse analysis of a single case—highlights the need to develop complementary research that incorporates empirical data on reception by different audiences, as well as comparative studies in heritage contexts outside Europe, where the relationships between technology, memory and representation are configured differently.

Contributions

Task	Author 1	Author 2
Conceptualisation	X	X
Content curation		X
Formal analysis	X	X
Acquisition of funds		
Research		X
Methodology	X	

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