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Cultural Heritage and Digital Laboratories: Learning and the Co-Construction of Meaning. A Case Study in a Secondary School.

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Abstract: Digital transformation has changed the way cultural content is communicated and produced, redefining teaching practices in heritage education and opening up new forms of participation for the school community. This article examines how cultural heritage can be conveyed in a formal setting through digital tools, promoting engagement, cultural identity and the co-construction of meaning. The theoretical framework integrates media education, sociocultural constructivism and heritage education; digital re-enactment and phygital artefacts support immersive and transformative learning. The first part analyses the methodology of the digital workshop, a blended learning environment in which teachers act as 'linking agents' and the educationalist as a designer, capable of producing knowledge through teaching practice. The metaverse constitutes the environment for co-construction. The second part presents the case study 'Digital Heritage in the Royal District', carried out with Federico II University and a third-sector organisation in a sixth-form college. The programme adopts a participatory action research approach and a mixed-methods methodology, involving pre- and post-intervention surveys and an analysis of digital outputs (Google Earth, Metasteps, virtual exhibition). The results highlight a predominantly positive evaluation, with the development of digital skills, identity and creative thinking; however, motivation to participate in the creation of digital heritage content remains an area for improvement. The positive outcome suggests a replicable model for the co-construction of meaning within a narrative framework of digital storytelling in a school context.

Keywords: heritage education; learning technologies; digital re-enactment.

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1. Introduction[1]

Digital transformation has changed the way cultural content is communicated and produced, redefining teaching practices in heritage education and opening up new forms of participation for the school community. The Faro Convention bases the transmission of heritage on the premise that knowledge and cultural heritage are human rights (Consiglio d'Europa, 2005, Art. 3), whilst in the school context, heritage education is defined as 'a pedagogy based on cultural heritage that incorporates active teaching methods' (Consiglio d'Europa, 1998). The National Plan for Cultural Heritage Education (Ministero della Cultura, 2021) and the PNRR's

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'Scuola 4.0' Plan (Ministero dell'Istruzione, 2022), with their Next Generation Labs dedicated to the Digital Humanities and the promotion of the local area, promote digital educational spaces and workshop-based experiences: the digital media era has, in fact, transformed cultural heritage into a hybrid text that tells stories through a continuum of tangible and intangible elements linked across time and space (Messina et al., 2023). According to the constructivist and constructionist perspective, digital technologies are cognitive artefacts through which knowledge is constructed, and the learner is the protagonist of their own learning, engaged in the production of shareable and socially situated artefacts (Papert, 1980; Marone et al., 2026, p. 185). From this perspective, digital laboratories are blended learning environments that combine the classroom with digital and virtual tools (Ciasullo, 2024), in which teachers act as 'linking agents' (Marone, 2023), creating a network that involves students, cultural practitioners and educators. From a bottom-up perspective, the student community plays an active role in the co-construction of cultural content (Bonacini, 2014, 2024), and teaching professionalism embraces 'onlife' as a natural habitat, in which the boundary between the real and the virtual has dissolved (Piva, 2023).

The Metaverse (a three-dimensional space in which users move around using avatars, create objects and interact), digital re-enactment (which uses virtual reality, AI-generated videos and 3D scanners to bring historical events to life) and 'phygital' artefacts that integrate physical and digital elements all support immersive and transformative learning. Teachers must, however, master these tools, bearing in mind that schools are designed to educate individuals capable of achieving self-fulfilment (Orefice 2011; Pizzo, 2023). The Metaverse in schools could become an Eduverse, featuring secure environments and licences that block inappropriate content and communication with external parties, protection of personal data, and a unified framework for shared implementation across the school (Pizzo, 2023). Since the real challenge in education lies in good digital governance rather than good innovation (Floridi in Scasciamacchia, 2023), initial empirical findings suggest that the value of immersive technologies depends on instructional design and teacher training (Mirra et al., 2025).

The need to tell stories and express oneself finds a privileged space in the storytelling of the Metaverse, where narrative becomes a more accessible and engaging experience (Natalini et al., 2024): stories transport pupils to different cultures and periods, helping them to develop empathy (Herrera, 2018 in Natalini et al., 2024). The documented experiments can be categorised into three types.

The first concerns virtual exhibitions and immersive tours that reconstruct heritage through digital re-enactment: 'Genoa and the Genoese in Palermo 1978–2025' (PNRR PE5 CHANGES project, University of Bari) reconstructed the 1978 exhibition on Artsteps with a virtual tour using computational and multi/trans-disciplinary approaches (Bonacini & Paolini, 2026). At the Alighieri Primary School in Mogliano Veneto, pupils created an exhibition on Kandinsky on Artsteps and used Google Arts and Culture for in-depth learning activities (Piva, 2023). Along the same lines is the reconstruction of La Belle Époque, created on Artsteps by the

Musco Comprehensive School in Catania: an interdisciplinary project that introduces pupils to the local historical and artistic context (Distefano, 2025).

The second type integrates playful and mnemonic elements, following the principles of edutainment. 'Memory Map', designed for upper secondary schools, combines the Metaverse, mind maps and AR headsets to explore the Bauhaus movement and the relationship between contemporary art and ecology (Bottai & Brilli, 2025).

The third category comprises collaborative repositories that focus on less immersive devices: Atlas/Saper vedere (a registered trademark and software of the University of Pisa) is a repository co-created by secondary school pupils in Trento, featuring images and tags, designed to develop critical thinking in the study of art history (Savettieri & Angelillo, 2025).

These experiences share the theme of students transitioning from consumers to producers of cultural content. Artsteps is the most commonly used platform, having been replaced by the new version, Metasteps, which was used in this study. The Scuola 4.0 Plan has promoted immersive classrooms and teacher training courses on the PNRR Scuola Futura platform, such as 'Immersive Reality: virtual and Metaverse-based teaching activities', which includes virtual storytelling (Scuola Futura, 2025); however, teachers report organisational challenges and the need for specific training and operational guidelines (Mirra et al. 2025). A number of limitations have emerged: pilot schemes remain limited in scope and are often merely descriptive, with little assessment of their impact on skills, identity and motivation; there is a lack of shared guidelines for replicable models of immersive storytelling in a school context, as well as a lack of national coordination between initiatives. In this context, this study – through participatory action research and a mixed-methods approach (pre- and post-intervention surveys, analysis of digital products and participant observation) – aims to design a model for transmitting cultural heritage in an immersive environment and to assess its effectiveness in strengthening, or building from scratch, students' sense of identity with that heritage, making them co-constructors of meaning.

2. Materials and Methods

2.1 Context and participants

The 'Digital Heritage in the Royal District' pilot project was carried out at the IISS Antonio Serra in Naples during the 2025–2026 academic year, involving a Tourism stream class (4D, 19 students) and a Chinese Language stream class (4A, 18 students), in collaboration with the Observatory on Governance for Education in Cultural, Artistic and Landscape Heritage (OGEP3 Unina) of the Department of Humanities at Federico II University and the Association of Royal Sites and Bourbon Residences. The 37 students were supported by three subject teachers, the scientific liaison officer from OGEP3 Unina, a PhD student and six staff members from the Association. One of the two researchers attended the sessions as an observer and guided the students in designing the virtual exhibition. The learning

environments were the school's IT and language laboratory (computer workstations, interactive whiteboards and Wi-Fi connection).

2.2 Research methodology

From a methodological perspective, the pilot project adopted participatory action research (PAR), in which those involved tackle operational problems together by developing actions aimed at bringing about change (Benvenuto, 2015), and knowledge is acquired through an exploratory phase of reality, using tools such as perceptual and emotional learning (Orefice, 2006). PAR was structured into cycles of planning (December 2025–January 2026), action within the school context (February–May 2026), and observation and shared reflection amongst researchers, teachers and practitioners, carried out on an ongoing basis. The students were involved in selecting the sites, co-creating bilingual content, deciding on the brochure's design, and designing the exhibition spaces and the avatar.

The research design is mixed-methods: qualitative and quantitative approaches are used synergistically at different stages of the research to answer the question that prompted it (Trinchero & Robasto, 2019). The quantitative data consist of the responses to the two surveys; the qualitative data consist of the digital outputs, observation notes and open-ended questions, which were integrated during the interpretation phase. The research questions were:

- How can a programme be designed to convey the cultural heritage of the Royal Sites to students in a formal setting, through innovative teaching methods and digital tools?

- To what extent did the programme strengthen, or build from scratch, a sense of identity with the region's cultural heritage, whilst promoting student engagement and the co-construction of shared meanings?

The project was divided into four phases totalling 36 hours: project presentation; workshop activities involving data collection; the creation of three digital products ('Naples: Capital' and 'Chinese Fashion' itineraries on Google Earth, a virtual exhibition entitled 'Digital Heritage' on Metasteps, and a bilingual digital brochure); and the presentation of the work at the Naples City Council Chamber (22 May 2026). The first three phases took place at school, with a site visit to the Royal Palace and the San Carlo Theatre. Surveys were administered at the start of the project (24 February 2026) and at the end (12 May). The data were analysed using descriptive statistics (percentages); digital outputs and observation notes were analysed qualitatively using indicators of engagement, sense of identity and creativity.

2.3 The historical and artistic context and the selection of the Royal Sites

In 1734, Charles of Bourbon conquered the Kingdom of Naples and Sicily and launched a policy of cultural, economic and proto-industrial development, within which the system of the 'Siti Reali' was established: a territorial organisation of centres serving as museums, residences, hunting grounds, administrative centres, agricultural estates and industrial sites. Quantifying them is no easy task, as they comprise residences (12 in Campania), Royal factories (19), powder magazines, stud farms, parks, reserves and gardens (25). Nine sites were selected for the project, identified through a participatory process with the students based on the two itineraries and their connection to the school context (Table 1).

Table 1. Royal sites included in the 'Naples: the Capital' and 'Chinese Fashion' itineraries on Google Earth.

Royal Site	Location	Itinerary
Royal Palace	Naples	Naples, the capital
San Carlo Theatre	Naples	Naples, the capital
Capodimonte Royal Palace and Royal Park	Naples	Naples, the capital
National Archaeological Museum	Naples	Naples, the capital
Villa Floridiana	Naples	Chinese fashion
Royal Palace of Caserta	Caserta	Chinese fashion
Royal Palace of Portici	Portici (Naples)	Chinese fashion
Villa Favorita	Herculaneum (Naples)	Chinese fashion
Chinese Pavilion	Palermo	Chinese fashion

2.4 Tools and materials

Slido and Google Forms were used for data collection; these were chosen because they are free and familiar to the students, who responded via their smartphones. The first survey, 'Bourbon Heritage and the Local Area: Knowledge and Perception of the City', administered via Slido on the first day, comprised eight questions across four sections (seven multiple-choice and one open-ended) to gauge respondents' stated knowledge of the local cultural heritage linked to the Bourbons and their feelings (sentiment) towards the local area. The second, 'Young People, Cultural Heritage and Digital Technology in the School Context', administered via Google Forms, comprised five sections: demographic profile (two questions), interest in cultural heritage and frequency of engagement (four), digital consumption and infodiversity (three), digital technology and school teaching (three), and heritage and digital technology (seven). The two surveys capture different aspects and have no overlapping items: they describe the starting point and the final perception, without allowing for a direct pre-post comparison.

The products were created using Google Earth, a free 3D mapping programme in which thematic itineraries and points of interest can be created, and Metasteps – the successor to Artsteps – a platform for setting up virtual 3D art galleries used by museums, artists and educational institutions[2] . Metasteps allows users to design 3D environments in a no-code mode via a web browser or mobile devices and offers interactive and educational tools (multimedia quizzes and collaborative features). It was chosen because it enables students to design exhibition spaces themselves; it is free and requires minimal equipment (computers, interactive whiteboards, an internet connection, a computer lab); it also allows students to practise digital skills and develop their spatial awareness. The immersive experience is that of 3D navigation on an interactive whiteboard: VR headsets were not used.

2.5 Teaching activities and objectives

The learning objectives were: to develop digital skills (virtual reality, photography, video, digital storytelling); interpersonal, cross-curricular and transversal skills (teamwork, project management, problem-solving, communication); to promote knowledge of and respect for tangible and intangible heritage; to foster informed and active citizens; and to apply digital tools to the promotion of cultural heritage with critical awareness. Cooperative learning was adopted, with groups of 3–4 pupils, in which the group acts as a means of individual improvement in the acquisition of content and social skills (Matini, 2024). For the brochure in Italian and Chinese, the pupils also met with a communications expert.

2.6 Ethical considerations and availability of materials

The trial formed part of the School-Work Training programme and was carried out during school hours, with the school's authorisation for School-Work Training activities. The surveys were completed on a voluntary and anonymous basis and analysed in aggregate form; observations were recorded in notes and documented with photographs and videos, whilst respecting privacy. The Eduverso conditions set out in the introduction were adhered to: the Metasteps account was set up by the association and used by pupils at school, under the supervision of the team, without any personal data or external users. The exhibition (the free 'Starter' plan in 'preview' mode) and the survey texts are available on request; the routes on Google Earth can be viewed at[3] .

[2] Artsteps was developed by Dataverse Ltd, a Greek company founded in 2007; Metasteps P.C. was established in 2022. Between 2024 and 2026, the technological development of the platform was partially co-funded by PNRR Greece 2.0 (NextGenerationEU). (Greek Ministry of Digital Governance, https://digitalsme.gov.gr/).

[3]https://earth.google.com/web/data=MkEKPwo9CiExNGs1cTNIeVpqU2dQSC1WRm5KQmJMLTlWMTZCX0cxQlESFgoUMEU2QTlFNkNFRDNFQ0M1NEI3NEIgAUICCABKCAjwmbuDAhAB?authuser=0.

3. Results

The results are based on an analysis of the percentage data from the surveys, summarising the most significant findings, and on an analysis of the digital outputs.

3.1. Findings from the first survey: Bourbon heritage and the local area: knowledge and perception of the city

Thirty-three students completed the first survey. The survey assessed preliminary knowledge of the history of the Bourbons in relation to the local cultural heritage, exploring participants' knowledge and curiosity about sites of interest. A lack of knowledge about the history of Naples emerged: 61 per cent said 'Not much, but I've always been fascinated by the subject', 27 per cent said 'Nothing, I've never heard of it', and 6 per cent said 'A lot, I'm very attached to the history of my city' and 'Just the right amount; I read the posts that appear on my social media feed', respectively. Eighty-eight per cent therefore showed a sense of distance from their local cultural heritage, and this was the area on which the subsequent educational programme was focused.

Students were also asked to define Naples using a single term, which was visually represented as a word cloud. The most frequently used terms (fantastic, beautiful, lively, sunny) highlight a positive sentiment amongst the student target group (aged 16–19). This perception is not to be taken for granted, given the socio-environmental challenges and shortcomings in services that characterise the urban context.

3.2 Results of the second survey: Young people, cultural and digital heritage in the school context

Thirty-six out of 37 students responded to the second survey. The aim was to validate a replicable and scalable educational model, geared towards the transmission of cultural identity and the co-creation of user-generated content (UGC).

Results of survey:

- Demographic profile and interest in cultural heritage: the group comprises 61.1 per cent of students aged 16–17 and 38.9 per cent aged 18–19. Interest in cultural heritage is significant (77.7% overall: 'quite a lot' 50%, 'a lot' 19.4%, 'a great deal' 8.3%), although a significant proportion of disinterest emerges (22.3%, of which 19.4% are 'not very interested'), which redefines the objectives of the educational programme.
- Frequency of participation and facilitating bodies: cultural participation is sporadic and externally driven: 58.3 per cent take part 2–3 times a year, 33.3 per cent just once, 2.8 per cent never, and 5.6 per cent frequently. School is the main facilitating agency (86.1% via educational trips), followed by the family (41.7%), peer networks (16.7%) and independent participation (8.3%). The sense of identity with the local area appears weak and is predominantly experiential in nature, with 58.3 per cent of respondents reporting a sense of detachment from their local community, compared with 41.7 per cent who feel a connection to it. The sites mentioned (Palazzo Reale, Maschio Angioino, Fontanelle Cemetery, Castel dell'Ovo, Quartieri Spagnoli) trace a shared map of both tangible and intangible heritage.

- Digital consumption and infodiversity: 86.1 per cent of students spend more than three hours a day online (3–4 hours: 36.1 per cent; over four hours: 50 per cent), favouring Instagram (72.2 per cent) and TikTok (66.7 per cent). Online searches for historical and artistic content are low: 52.8 per cent do so rarely (41.7 per cent) or never (11.1 per cent), with zero (0 per cent) reporting the highest frequency.
- Digital technology and school teaching: 58.3 per cent use digital platforms to study cultural heritage, drawing on unverified sources (YouTube 16.7 per cent, Google 11.2 per cent, Skuola.net 8.4 per cent, ChatGPT 2.8 per cent, influencers/TikTok 2.8 per cent). Although 88.9 per cent consider digital tools to be effective for learning, a moderate view prevails (quite effective: 61.1 per cent; very and extremely effective: 13.9 per cent each). Among the tools they would like to see, students mention general-purpose platforms derived from distance and blended learning (Google, Google Classroom), productivity software (Word, PowerPoint) and improvements to infrastructure (tablets, PCs, iPads, headphones). There are also calls for generative AI and gamification solutions (Gemini, ChatGPT, Knowunity, Kahoot), for which there is a recognised need for critical literacy training.
- Asset base and online-to-offline conversion dynamics: digital as an interface for discovery, as 94.4 per cent discovered a venue via the web or social media and 72.2 per cent subsequently paid a physical visit. On a Likert scale (1–5), chosen to measure students' perceptions, 75 per cent acknowledge the influence of 'Instagrammable' aesthetics on their decision to visit (47.2 per cent 'somewhat', 27.8 per cent 'very'), compared with 5.5 per cent who disagree. 47.2 per cent believe that social media enhances the appeal of culture, whilst confirming a preference for the in-person experience (69.45 per cent) over the virtual one.
- Prospects for co-creation and evaluation of the project. The key focus for action lies in motivation for digital cultural design: 47.2 per cent say they are open to co-creation and 11.1 per cent express a strong willingness to get involved. The project experience was rated as interesting by 66.7 per cent of students, neutral by 27.8 per cent and uninteresting by 5.6 per cent.

3.3 Digital outputs: the itineraries, the bilingual brochure, the virtual exhibition

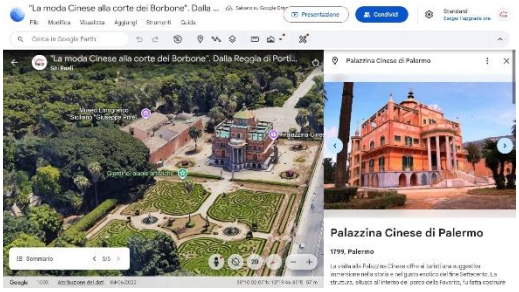
The students identified the sites, co-created texts, images and videos, and designed two itineraries for Chinese tourists: 'Naples: the Capital' (Figure 1), focusing on the main urban sites linked to the school's curriculum (the National Archaeological Museum, the Royal Palace and Capodimonte Park, the Royal Palace and the San Carlo Theatre); and 'Chinese Fashion' (Figure 2), dedicated to 18th-century chinoiserie (the Royal Palace of Portici, Villa Floridiana, Villa Favorita, the Royal Palace of Caserta and the Palazzina Cinese). The students in Class 4D Tourism, who were unfamiliar with Google Earth and confused it with Google Maps, created the itineraries on within the context of a travel agency, thereby developing an awareness of careers in cultural heritage and tourism.

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Figure 1. Screenshot from the 'Naples: Capital in Chinese' itinerary. Information sheet on the Royal Palace.



Figure 2. Screenshot from the 'Chinese Fashion' itinerary. Information sheet on the Chinese Pavilion.



For the same target audience, a digital brochure in .pdf format was produced, written in Italian and translated into Chinese by Class 4A Linguistico (Figure 3).

Figure 3. Digital brochure.



The virtual exhibition 'Digital Heritage', created by the students on Metastep, uses digital storytelling to reconstruct the process of realising the project in three sections. The 3D environment is divided into themed exhibition areas featuring windows, seating and educational panels. An avatar was created, with which the students identified (Figure 4), which navigates the exhibition spaces on a virtual tour

through a digital re-enactment that immerses visitors in the world of the Royal Sites (Figure 5).

Figure 4. Visitor avatar in the virtual exhibition.

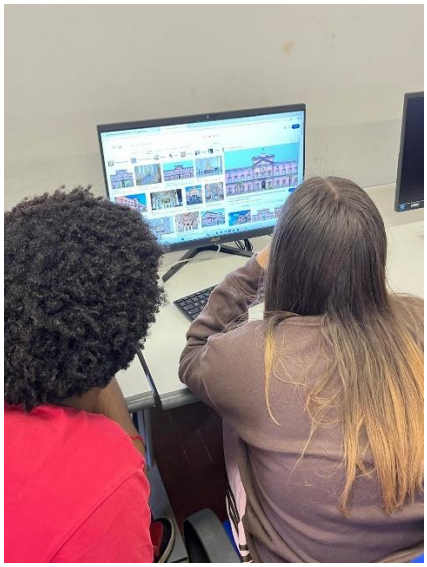


Figure 5. The virtual exhibition.



The 'Work in progress' section documents the activities, the creation of itineraries, the selection of texts and the Chinese translations by Class 4A of texts from the royaldistrict.it website (Figure 6).

Figure 6. Students during the activities.



The 'Discover Royal Sites' section documents the site visit, which is useful for planning itineraries (Figure 7).

Figure 7. The virtual exhibition. 'Discover Royal Sites' section.



'Travelling through the Royal Sites' brings together heritage storytelling resources: a brochure featuring an audio-visual clip in Chinese, a bilingual itinerary, a section on the Royal District platform in Chinese, and two extracts from the bilingual itineraries on Google Earth.

3.4 Dissemination and engagement of local stakeholders

The involvement of local stakeholders, from a participatory perspective, saw the attendance of several institutional representatives and the school community at the closing meeting held in the Council Chamber of Naples City Council.

4. Discussion

The analysis shows that innovative, digital teaching on the Royal Sites can convey cultural heritage within a formal context as well as in informal learning environments: itineraries, brochures and the exhibition demonstrate that the pupils were co-creators of content and that Google Earth and Metasteps, intuitive tools, supported collaborative work and engagement. The framework of digital storytelling enabled the project process to be recounted through an avatar with which students could identify, in line with the idea that storytelling builds community (Natalini et al., 2024). Overall, the programme helped to strengthen, or create from scratch, a sense of identity with cultural heritage: to this end, at the end of the programme, 77.8 per cent of students expressed an interest in monuments and cultural sites, 41.7 per cent reported a connection to their local area (compared with 58.3 per cent who described themselves as detached), and 66.7 per cent found the project experience interesting.

86.1 per cent of students spend more than three hours a day online, but 52.8 per cent rarely or never search for cultural content: 'onlife' (Piva, 2023) does not equate to the cultural use of these tools. This figure is consistent with national survey: the ISTAT report indicates that the 15–24 age group spends the most time online, with an average of 5 hours and 47 minutes a day, mainly on social media (ISTAT 2026, p. 149), whilst the survey of children aged 8–16 (MIMIT, 2024)[4] reveals that seven out of ten respondents are already regular users of social media from the age of 8. The least favourable indicator concerns motivation to continue with co-creation: 47.2 per cent say they are willing to do so and 11.1 per cent are strongly motivated, compared with 66.7 per cent who find the project interesting and 88.9 per cent who consider digital technology effective for learning cultural content. One possible explanation, which requires further verification, is their inclusion in the FSL, which may have led them to associate content creation with a curricular requirement: it is therefore important to strengthen the students' agency (choice of websites, formats and target audiences). Furthermore, digital technology facilitates access (94.4 per cent discovered a website via social media or the internet) but does not replace direct experience (69.4 per cent prefer an in-person visit): this confirms the 'phygital' approach, in which site visits are an integral part of the model.

Digital workshops for cultural heritage can be regarded as a replicable model for the co-construction of meaning within a framework of digital storytelling. As in literary experiences, the student moves from being a consumer to a producer of content (Bonacini & Paolini, 2026; Savettieri & Angelillo, 2025); and as Mirra et al. (2025) point out, for virtual reality, instructional design and teacher training—now also offered by programmes such as Scuola Futura (2025)—remain crucial: in this context, the role of the educationalist who designs teaching strategies using a multidisciplinary approach and guides the students is decisive. Compliance with the conditions of the Eduverso addresses the need for digital governance (Floridi in Scasciamacchia, 2023). The model's strengths lie in its sustainability (free tools and

[4] Survey commissioned by the Ministry of Enterprise and Made in Italy with scientific collaboration from the Graduate School of Media, Communication and Performing Arts at the Catholic University, published on 15 February 2024.

standard school equipment), the optional use of smartphones, cooperative learning, teachers acting as 'linking agents' (Marone, 2023) and the partnership between schools and universities. A new trial could involve a larger sample of students, surveys with common items before and after the intervention, a follow-up survey several months later, extension to other schools, and the selection of topics by students right from the planning stage.

5. Conclusion

This paper has presented a digital workshop on heritage education, carried out with two classes at a secondary school in Naples, in which pupils co-created content on the Bourbon Royal Sites using free tools and standard school equipment.

With regard to the first research question, the project demonstrates that it is possible, within a formal setting, to design the transmission of cultural heritage through cooperative and digital teaching methods, structured around itineraries on Google Earth, a bilingual brochure and a virtual exhibition on Metasteps, within a framework of digital storytelling. With regard to the second research question, the data reveal a significant proportion of pupils who feel disconnected from their local area, a predominantly positive assessment of the experience and, in the final products, qualitative indicators of participation and identification, such as the avatar. A strengthening of identity emerges from the responses to the second survey (interest in heritage, connection to the local area, evaluation of the experience), whilst the aspect requiring further development is the motivation to continue with co-creation, which may have been influenced by the inclusion of the FSL programme.

The model appears to be sustainable and potentially replicable in contexts with similar resources, provided that the link between direct experience and digital mediation is maintained; students' agency is strengthened; education on social media and AI is integrated; and the cultural heritage experienced by the students is valued. The research confirms the role of storytelling, meaning-making and the experiential dimension in learning within formal contexts. Further trials will be needed to test its viability.

References

Artsteps. (2023). About Artsteps. [Blog post] Medium. https://blog.artsteps.com/about.

Benvenuto, G. (2015). Stili e metodi della ricerca educativa, Carocci.

Bonacini, E. (2014). Dal Web alla App Fruizione e valorizzazione digitale attraverso le nuove tecnologie e i social media, Giuseppe Maimone Editore.

Bonacini E. (2024). Musei digitali e generazione Z. Nuove sfide per nuovi pubblici, Edipuglia

Bonacini, E., & Paolini, A. (2026). Nuove frontiere per un Digital Art Historian: la mostra virtuale "Genova e i Genovesi a Palermo 1978-2025" e il suo tour interattivo. In G. Volpe (Ed.), Patrimonio storici, tradizioni e identità culturali (pp. 1-14), Edipuglia. doi http://dx.doi.org/10.4475/1724_37.

Bottai, M.S., & Brilli, A. (2025). Un diario de experiencias educativas para la historia del arte, entre el metaverso y la IA, Hernando García-Cervigón A., Martínez de Carnero F., Candorcio Rodríguez N., Inteligencia artificial, tecnología y discurso en la educación superior (pp. 31-47). Editorial Comares.

Ciasullo, A. (2024). Il futuro dell'apprendimento. Progettazione bioeducativa e intelligenze artificiali, Mondadori Università.

Consiglio d'Europa, Comitato dei Ministri. (1998). Raccomandazione n. R (98) 5 agli Stati membri in tema di educazione al patrimonio (adopted on 17 March 1998).

Consiglio d'Europa. (2005). Convenzione quadro del Consiglio d'Europa sul valore dell'eredità culturale per la società (CETS n. 199). Faro, 2005 October 27.

Distefano, A. (2025). La Belle Époque: mostra virtuale con ARTSTEPS. Istituto omnicomprensivo A. Musco. https://www.musco.edu.it/schede-didattiche?id=897

ISTAT (2026, 21 maggio). Rapporto annuale 2026. La situazione del Paese. https://www.istat.it/produzione-editoriale/rapporto-annuale-2026-la-situazione-del-paese/

Likert, R. (1932). A Technique for the Measurement of Attitudes. *Archives of Psycology*, 22 (140), 1-55.

Marone F. (2023). Patrimonio culturale e territori: l'intreccio tra ricerca e formazione. In
R. M. Mancaniello, F. Marone & M. Musaio (Eds), Patrimonio culturale e comunità educante. Per la promozione di un nuovo welfare urbano, Mimesis (pp. 105-157).

Marone, F., Curci, I. & Pirro, M. (2026). La formazione degli insegnanti STEM come pratica critica: Intelligenza Artificiale Generativa, approcci STEAM e responsabilità educativa [STEM Teacher Training as Critical Practice: Generative AI, STEAM Approaches and Educational Responsibility]. QTimes webmagazine,18 (2), 182-189.

Matini, C. (2024, 2 ottobre). Inclusione a scuola, il ruolo del Cooperative learning. Associazione Italiana Formatori. https://associazioneitalianaformatori.it/inclusione-a-scuola-il-ruolo-del-cooperative-learning/

Messina, S., Macauda, A. & Panciroli, C. (2023). Heritage education and media literacy: analysis of digitization practices. Educazione al patrimonio e media literacy: analisi di pratiche di digitalizzazione, in IMG23 _ 4th International and interdisciplinary conference on images and imagination, conference proceedings, University of L'Aquila, 6–7 July 2023 (pp. 67-74).

Ministero della Cultura (2021). PNE Piano Nazionale per l'Educazione al patrimonio culturale, Direzione generale Educazione, ricerca e istituti culturali (ed.). https://dgeric.cultura.gov.it/wp-content/uploads/2021/11/Piano-Nazionale-per-lEducazione-al-patrimonio-2021.pdf.

Ministero delle Imprese e del Made in Italy – MIMIT (2024, 15 February). Alfabetizzazione mediatica e digitale a tutela dei minori: comportamenti, opportunità e paure dei navigatori under 16. https://www.mimit.gov.it/images/stories/documenti/Infografiche_Alfabetizzazione_Digitale_Minori.pdf.

Ministero dell'Istruzione (2022). Piano Scuola 4.0. In attuazione della linea di investimento 3.2 del Piano Nazionale di Ripresa e Resilienza, (PNNR) (Decreto Ministeriale, 2022 June 14, n. 161). Istruzione.it

Mirra, M., Campitiello, L., Bilotti, U., Rescigno, A., Stizzo, I., di Tore, S. (2025). Impatto della realtà virtuale sull'apprendimento immersivo: motivazione, partecipazione e percezione di studenti e docenti nella scuola secondaria. Journal of Inclusive Methodology and Technology in Learning and Teaching, 5 (4).

Natalini, A., Orecchio, F. & Giuliani, D. (2024). Narrative in teaching-learning processes through the virtual worlds of the metaverse. Formazione & Insegnamento, 22(2), 56–72.
https://ojs.pensamultimedia.it/index.php/siref/article/download/7411/6461

Orefice, P. (2006). La ricerca azione partecipativa. Teoria e pratiche, Liguori Editore.

Orefice, P. (2011). Pedagogia sociale. L'educazione tra saperi e società, Bruno Mondadori.

Papert, S. (1980). Mindstorms: Children, Computers, and Powerful Ideas. Basic Books.

Piva, M. (2023). Virtual tour e didattica immersiva: creazione di un museo virtuale interattivo nella scuola primaria, IUL Research, Open Journal of IUL University, 4 (7), 313-328

Pizzo, A. (2023). Il Metaverso è formativo?. Culture Digitali, anno 3, n. 8, gennaio-aprile 2023, pp. 46-49.

Savettieri, C., & Angelillo, A. (2025). Atlas/Saper vedere: Per una didattica innovativa della storia dell'arte e dei linguaggi visivi. Pisa University Press.

Scasciamacchia F. (2023). Metaverso e gamification: un nuovo orizzonte per la scuola?, Iul Research, 4 (7), 1-12

Scuola Futura. (2025). Immersive Reality: attività didattiche virtuali e nel Metaverso [Percorso formativo, ID 404637, Polo Formativo 2024-2026 Palma di Montechiaro]. Ministero dell'Istruzione e del Merito. https://scuolafutura.pubblica.istruzione.it/archivio-corsi/42968f2d-8c5c-8daa-e009-03794b9da1c0.html (accessed on 8 October 2026).

Trinchero, R., Robasto, D. (2019). I mixed methods nella ricerca educativa, Mondadori Università.