

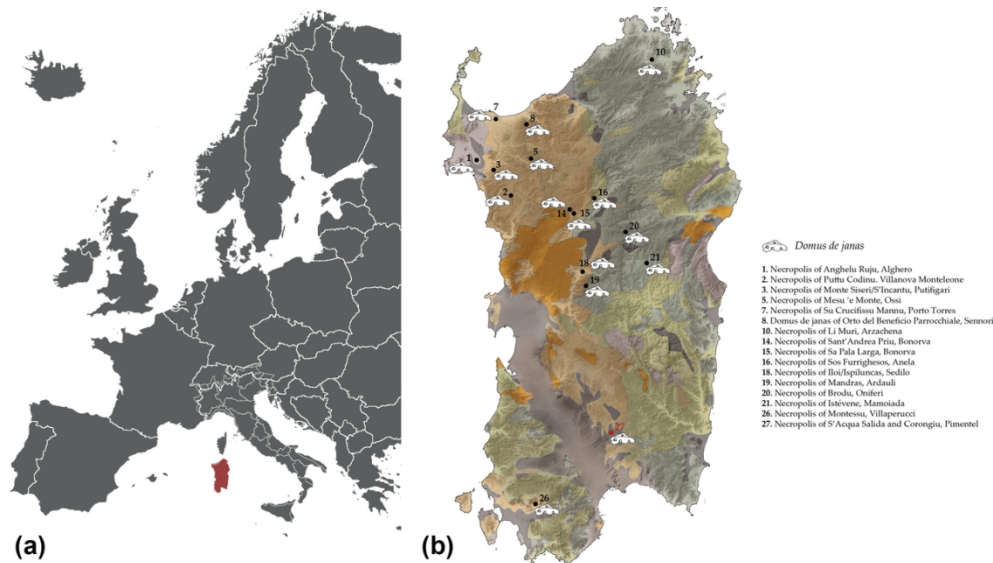


Figure 1: Geographic map of the location of Sardinia. (b) Domus de Janas nominated for the UNESCO WHL in black. In red the site of Necropolis of S'Acqua Salida and Corongiu, Pimentel, excluded by the nomination.

218x122mm (150 x 150 DPI)



Figure 2: The Necropolis of S'Acqua Salida and Corongiu in Pimentel: from the left, location within Sardinia; Aerial photographic survey of complex A; Aerial photo of complex B.

246x63mm (150 x 150 DPI)



Figure 3: The Necropolis of S'Acqua Salida and Corongiu in Pimentel: from top left, aerial view of the necropolis of Corongiu, Pimentel; views of the complex A; interiors of the complex B.

302x174mm (150 x 150 DPI)



Figure 4: The Necropolis of Montessu in Villaperuccio: from the left, location within Sardinia; Aerial photo of the village Villaperuccio and necropolis of Montessu; Aerial photo of the necropolis of Montessu.

246x63mm (150 x 150 DPI)



Figure 5: The Necropolis of Montessu: from the top left, tomb II; view of the valley; tomb VII; figurative motif detail of Tomb XXXIV; motifs of taurine horns; tomb's entrance.

259x171mm (150 x 150 DPI)



Figure 6: Site visits and empirical studies in the Necropolis of Villaperuccio and Pimentel.

286x172mm (150 x 150 DPI)

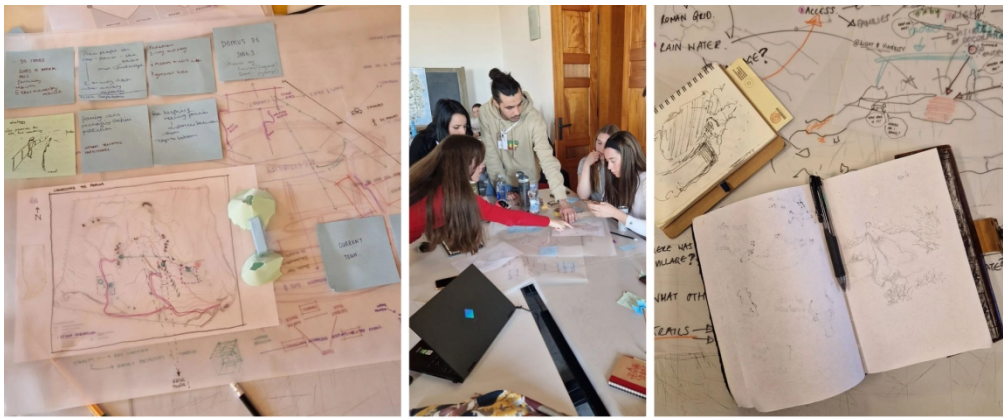


Figure 7: Co-creation/Co-design workshops at the University of Cagliari, Italy, 2023.

327x135mm (150 x 150 DPI)



Figure 8: Co-creation/Co-design workshops at the University of Cagliari, Italy, 2023.

293x139mm (150 x 150 DPI)

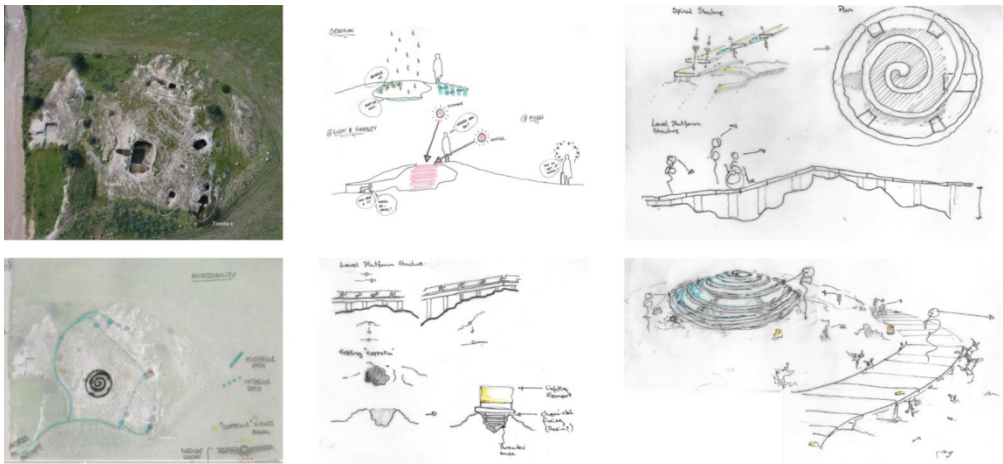


Figure 9: The spiral intervention proposal conceptual drawings (produced by Team 1: Jackie Deverrell, Deena Mughal, Iulia Buturuga, Stephania Casula)

335x154mm (150 x 150 DPI)

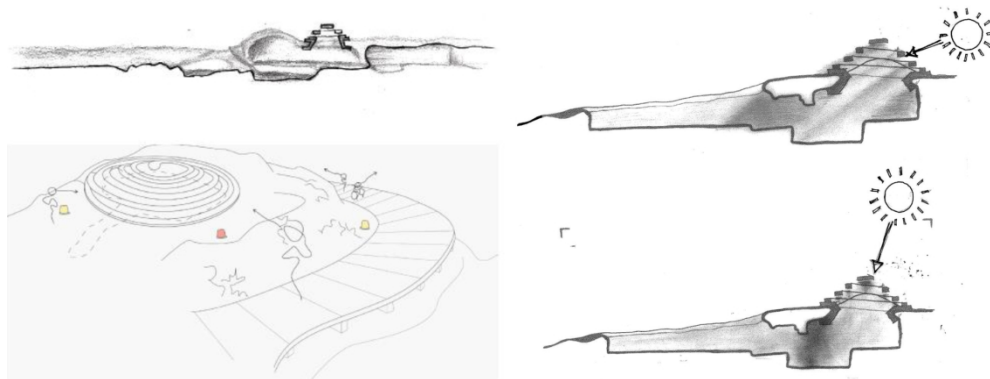


Figure 10: The spiral intervention proposal conceptual drawings (produced by Team 1: Jackie Deverrell, Deena Mughal, Iulia Buturuga, Stephania Casula)

335x126mm (150 x 150 DPI)

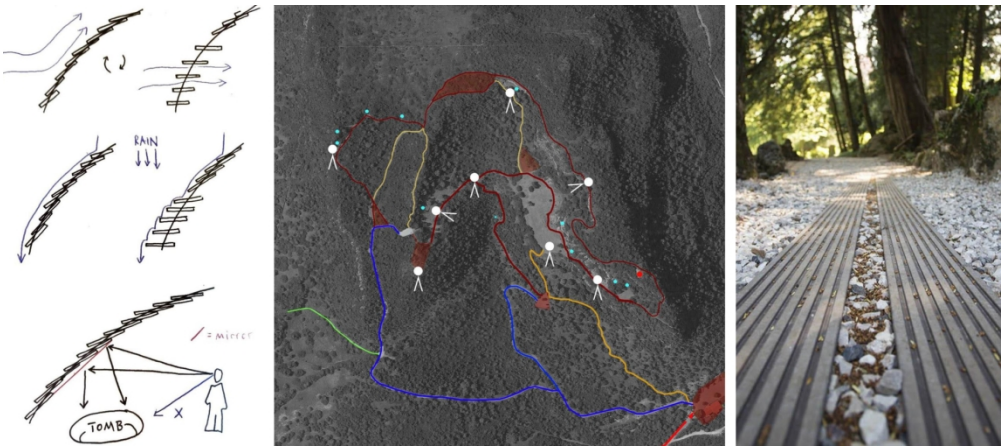


Figure 11: The Immersive Shelters Network proposal conceptual drawings (produced by Team 2: Harry Philipson-stow, Majid Sallomi, Laxhaan Sunderakanthan, Suren Patel, Nicolo Steri, Pierluigi Spano, Nicolo Steri, Elisabetta Mannai)

333x147mm (150 x 150 DPI)

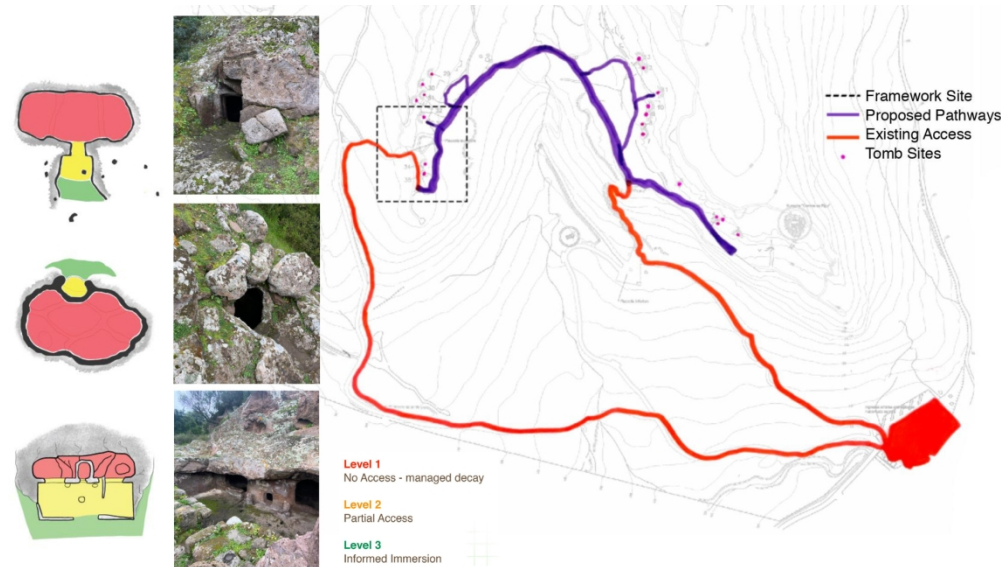


Figure 12: The Memories of the Future proposal conceptual drawings (produced by Team 3: Cerian Mair Frost, Louis Marks, Lily Ward, Abigail Ogden-Metherell, Antonio Tamburini, Giuseppina Pinna, Raffaele Serreli)

336x190mm (150 x 150 DPI)



Figure 13: The Memories of the Future proposal conceptual drawings (produced by Team 3: Cerian Mair Frost, Louis Marks, Lily Ward, Abigail Ogden-Metherell, Antonio Tamburini, Giuseppina Pinna, Raffaele Serreli).

314x168mm (150 x 150 DPI)



Figure 14: The Frame of Life proposal conceptual drawings (produced by Team 4: Amber Say, Joe Brandreth, Rebecca Rowan, Zuzanna Cwikla, Nicole Bellu, Sara Cavada, Chiara Serreli).

503x125mm (150 x 150 DPI)

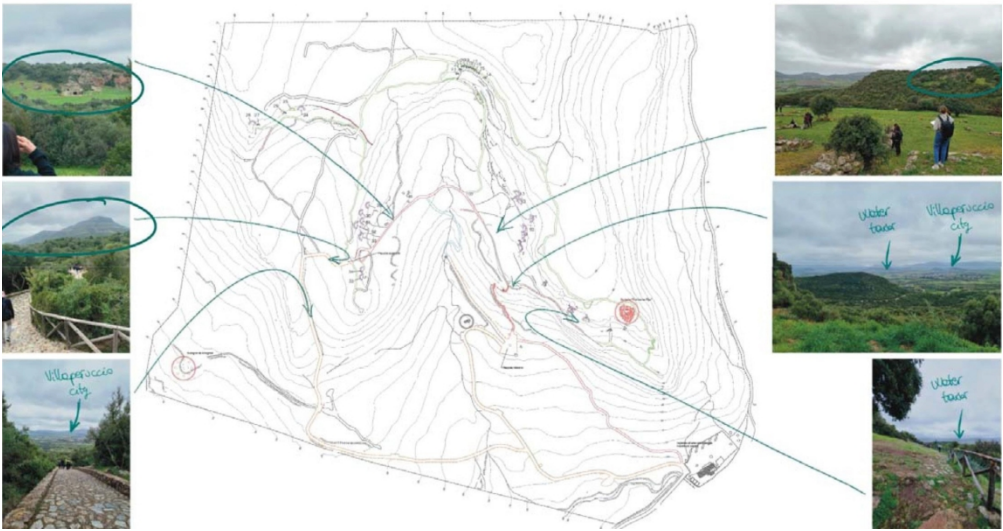


Figure 15: The Frame of Life proposal conceptual drawings (produced by Team 4: Amber Say, Joe Brandreth, Rebecca Rowan, Zuzanna Cwikla, Nicole Bellu, Sara Cavada, Chiara Serreli).

316x168mm (150 x 150 DPI)

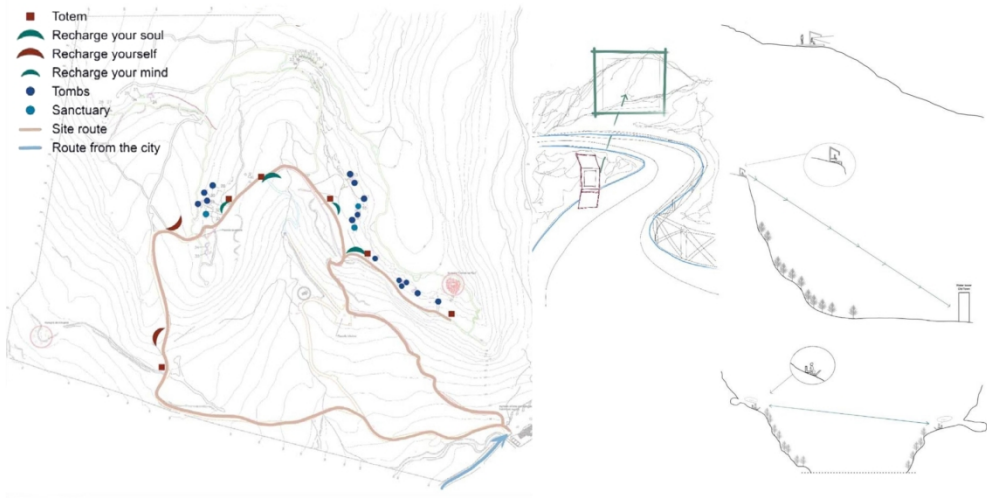


Figure 16: The Frame of Life proposal conceptual drawings (produced by Team 4: Amber Say, Joe Brandreth, Rebecca Rowan, Zuzanna Cwikla, Nicole Bellu, Sara Cavada, Chiara Serreli).

338x172mm (150 x 150 DPI)

Cross-border Co-Creation of Conservation Perspectives for the archaeological sites *Domus de Janas*, Sardinia – Italy

Tarek Teba, Elisa Pilia, Donatella Rita Fiorino & Giovanna Concu

Abstract

Purpose: This article explores how co-design/co-creation among students and academics from different countries, as well as stakeholders, could contribute to providing archaeological conservation solutions for Sardinian pre-Nuragic sites called *Domus de Janas*. The sites are represented by rock-cut hypogeum tombs that constitute a unique heritage, but still not well preserved, interpreted and protected. Thus, the study presents the process and outcomes of co-creation work between UK (University of Portsmouth) and Italian (University of Cagliari) students and academics with the Villaperuccio and Pimentel councils and the site managers of Montessu, S’acqua Salida and Corongiu respectively.

Design/methodology/approach: The study introduces a co-creation workshop that aimed to develop archaeological conservation perspectives for the sites and focused on three themes: 1) accessibility, 2) material and structural conservation, and 3) interpretations, protection and musealisation. The workshop applied archival analysis methods to establish the values of the sites, as well as empirical architectural analysis to contextualise the established values within the contemporary physical context, and to identify the main issues that challenge these heritage assets. Focus groups with stakeholders followed by co-creation/co-design workshops were conducted to synthesise conservation strategies and concepts for the two selected sites.

Findings: Four interdisciplinary conceptual conservation proposals and restoration strategies were produced, driven by theoretical and practical understanding of the sites’ key cultural significance and values as well as conservation theories. The co-creation process and outputs are critically analysed to appraise their contribution to the sites’ significance, conservation and protection. Also, the study investigates the contribution of the co-creation activities to the participants’ interdisciplinary understanding of heritage conservation in the context of archaeology through exchanging knowledge and skills across borders. It was established that decay is an opportunity to promote the sites authenticity, while the landscape is a powerful context to be used as part of the revitalisation and musealisation strategies for a better visitor experience.

Originality/value: This study contributes original insights to the discourse of archaeological conservation and how architecture and design could be utilised as powerful tools to revitalise hidden values and narrative through co-creative processes. It highlights the original contribution of the young generation (students from multicultural backgrounds) to heritage conservation and revitalisation discourses by synthesising original proposals based on their collective values. This emphasises the need for wider inclusion and participation in conservation practices through the use of new engaging methods and tools.

1. Introduction: Architectural and Archaeological Conservation and Co-Creation

The concept of conservation becomes an effective way to reconstruct cultural identity and the sense of place through structured historic narratives and interpretations (Matero, 2006). Respecting the original cultural heritage including its aesthetic, historic and physical integrity is a primary principle that governs conservation process as advised in many international conventions (e.g. UNESCO 1978: article 1, 3 & 9; Australia ICOMOS 1988: article 2 & 3). Therefore, this discipline incorporates different measures that are applied to physical and anthropological heritage (Orbasli, 2008). The conservation of archaeological sites is a more complex process; it is not only about the tangible archaeological remains, represented in specific urban and architectural fabric. This process also deals with the historic and social values related to the civilization’s history, cultural system and people’s achievements (Berducou, 1996; G. Carbonara, 1996). In this sense, the overall value is perceived as a result of full integration between the tangible and intangible values of the archaeological site (Berducou, 1996; Orbasli, 2008). The conservation of archaeological sites requires identifying these values and understanding how they are represented in the physical fabric. Consequently, conservation in this particular context comprises all measures which are carried out to preserve the physical fabric and its historic settings, information and authenticity and to retain them for future generations.

An archaeological site holds various values; each group of its users (e.g. archaeologists, architects, tourists, students, public community, etc.) assigns different values according to the users’ interest in the ruins. Identified values of the archaeological site have a great impact on the direction that the conservation process takes. Therefore, it is essential to adopt a comprehensive approach that enables decision-making, flexible enough to adapt as the values emerge. It is also important to consider the balance between the sciences of archaeology, architecture and conservation. The presence of such a type of heritage (archaeological site) in conservation studies distinctly involves the concept of surrounding context (Matero, 2006; Orbasli, 2008) and destruction factors, such as human negligence and natural effects (Berducou, 1996). These ingredients collectively establish the real environment in which the archaeological site is located. For that reason, many authors emphasise the key role of the whole context and environment in conserving cultural heritage sites. Orbasli (2008), for example, insists on the importance of considering the surrounding contextual, social and political settings in archaeological sites conservation. Justifications can be derived from the fact that this context has been created through the whole civilisation’s history, including its movement and associations with other civilisations (Matero, 2006). Consequently, this context holds many values and events, contemporary with the ancient civilisation’s life. Thus, the context is the narrator that tells the civilisation’s story and conveys the site’s messages. John Ruskin, the leading English art critic of the Victorian era and the writer of “The Seven Lamps of Architecture” (Ruskin, 1892), stresses this point and urges that any building or site should be conserved in accordance with the surrounding context and environmental settings (Orbasli, 2008). Therefore, Architecture as a discipline has invaluable contribution to the conservation process; architectural conservation links the physical heritage to past society values (Agnew & Bridgland, 2006; Agnew, Demas, & ICOMOS, 2002; Orbasli, 2008) and exposes its cultural significance and links to the contemporary time and society. It also seeks to protect ancient monuments and sites from natural or human threats (Agnew & Bridgland, 2006; Agnew et al., 2002). In this sense, the architectural conservation process intends to envision the best type of intervention which implements the conservation goals. It is perceived that architectural conservation is not too different from architectural design, as the two processes adopt creative ideas to promote the building function. However, in the case of architectural conservation, adding new designs and materials to historical buildings is carefully considered, which highlights the priority of material conservation and heritage sustainable management (Orbasli, 2008). An archaeological site has a dual perspective in conservation, as it is considered as a place and document (Matero, 2006). In such objects, the conservation process maintains the site authenticity and retains its values for future generations without altering the site’s historical conditions (Agnew et al., 2002). Therefore, the architectural aspect of conservation involves different terms and levels of intervention in accordance with the hierarchy of identified values (Lin et al., 2023), where

restoration and reconstruction are involved in the inclusive notion of conservation. Considering their objectives, restoration and reconstruction are similar to conservation in terms of durability, accessibility and integrity, but less broad as they are related only to the management of tangible heritage (Berducou, 1996). Thus, conservation works towards protecting and presenting tangible and intangible evidence of archaeological sites and their ancient inhabitants through applying creative methods such as architecture and different levels of intervention.

Considering the importance of tangible and intangible heritage as well as the relevance to the current and future generation, the conservation of archaeological ruins becomes a site specific process that is linked to the current communities residing nearby (Matero, 1993, 2006). Therefore, conservation approaches and designs should be created through participatory processes. In this context, the co-design/co-creation is a well-used methodology with local communities and/or stakeholders to produce conservation visions for historic buildings and sites (Maye & Claisse, 2022). It represents a way to properly engage people with developing solutions and responding to challenges while maintaining clear ownership of ideas and contributions (Blomkamp, 2018; Lacedelli, Fazzi, Zanetti, & Pompanin, 2023; Phillips & Gant, 2021). Thus, co-creation methodologies in the context of conservation build networking and collaboration between academic, public and community sectors to develop contemporary related and culturally rooted solutions that bring protection, interpretation and economic development for the cultural heritage assets. As a result, this develops sustainable public and community agency in understanding, caring and revitalising heritage (Fredheim, 2019). Though such an effective participatory process, interpretations and meanings are considered from different perspectives related to the historic values of the ruins and their associated stories and myths, as well as to the contemporary social values of local communities to inform decision-making; this aids developing creative and sustainable tourism development strategies for archaeological sites (Ross & Saxena, 2019). In addition, as the physical structures are the authentic representation of the past and hold/contextualise the historic and contemporary values (G. Carbonara, 1996; Giovanni Carbonara, 2012; Matero, 1993, 2006), co-creation not only fosters the generation of protection priorities and strategies (Grcheva & Oktay Vehbi, 2021), but also develops local and communities' stewardship to maintain the physical conditions and integrity of heritage and archaeological sites (Bollwerk, Connolly, & McDavid, 2015). Therefore, co-creation is a powerful process to share knowledge, to co-produce values based on local and wider perception of heritage (Habiyaemye, 2020; K. Paswan, D'Souza, & K. Rajamma, 2014), and consequently, to co-design appropriate and meaningful protection and interpretation strategies. Within educational settings, this is more meaningful, as co-creation is a tool to engage students from different disciplines with real-life scenarios, providing interdisciplinary solutions, and engaging young generations with cultural heritage and its values and challenges. This not only harnesses creative interdisciplinary ideas by those young professionals but also involves them deeply in understanding and protecting heritage, strengthening the young generation's appreciation and attachment to their cultural heritage.

This article focuses on Sardinian pre-Nuragic archaeological sites called *Domus de Janas*, and explores how co-creation/co-design between architecture and conservation students, professionals and stakeholders from different countries could contribute to developing visions that aim to protect and facilitate the exploration and understanding of these sites. The main aim of this study is to test the contribution of co-design/co-creation to the management of archaeological sites from different perspectives; through an inclusive practice, the study involves young generations of relevant disciplines to drive ideas production, with input from stakeholders, academics and communities. This ensures that the diversity of values assigned by different actors are considered, and embraces the synthesis of a holistic conservation approach that meets the collective interest and informs the development of sustainable conservation interventions.

2. *Domus de Janas* heritage and challenges

The island of Sardinia, located in the centre of the Western Basin of the Mediterranean (Figure 1a), is a crossroads of peoples and cultures, characterised by a heterogeneous and stratified archaeological heritage. The heritage of this cultural environment ranges from the Middle Neolithic, the Copper Age, up to the dawn of the Bronze Age and before the start of the Nuragic civilization, between the 5th and the end of the 3rd millennium BCE. This diverse heritage has been analysed in-depth due to its uniqueness and authenticity. Thus, this study is included as part of a wider project to add this valuable heritage to the UNESCO Tentative List with the nomination "Art and Architecture in the Prehistory of Sardinia, the *Domus de Janas*". With this aim, 26 monumental complexes which are representatives of about 5,000 monuments or places inhabited by island communities during Prehistory have been selected for the nomination (Figure 1). This work has witnessed the collaboration of public institutions, territorial bodies, research institutes and representatives of the communities. The selected period is marked by the presence of two major cultural phenomena documented along the coastlines of the Mediterranean and continental Europe: hypogeism and megalithism. Both phenomena resulted in a great variety of structures/sites built using novel construction techniques: rock excavation and three-stone construction, not to mention the dry stone construction technique, popular on the island and still surviving to date (G. Tanda, Doro, Usai, & Buffoni, 2023).

Among the selected monuments are the *Domus de Janas*, artificial funeral caves and an expression of funerary hypogeism, stand out for their high number. This burial model includes about 3,500 examples in Sardinia, and at least 220 of them have diverse art and decorative motifs (figurative, geometric and depiction of architectural elements). These decorations were made using sculpture, painting, and engraving (G. Tanda, 2000, 2021), which contributes to the uniqueness and values of this historical, cultural and artistic heritage.

Figure 1: (a) Geographic map of the location of Sardinia. (b) *Domus de Janas* nominated for the UNESCO WHL in black. In red the site of Necropolis of S'Acqua Salida and Corongiu, Pimentel, excluded by the nomination.

Domus de Janas are architectural elements that provide functional data for the reconstruction of the most comprehensive general picture of Sardinian Prehistory; they are the material testimony to the skills, knowledge and beliefs of the communities settled on the island. These structures evoke the genius loci and/or toponyms of their areas, and testify to the fact that these places had been known about and attended to by local communities for a long time. The interconnection among communities, places and monuments is undeniable. It is a cognitive bond that attributes

¹ This research has been established by CeSim – Centro Studi Identità e Memoria, and the Municipality of Alghero (SS, Sardinia). On April 9, 2021, following the positive opinion of the Italian Ministry of Culture (MiC), in consultation with the Italian National UNESCO Commission (CNIU), the proposal was submitted. Studies and co-creation activities were developed in the framework of a research agreement signed by the University of Cagliari – Department of Civil-Environmental and Architecture (DICAAR) and CeSim, in cooperation with the Municipalities of the sites involved.

an identity value to these monumental complexes and is based on an emotional connection of belonging and familiarity, a sense of place. This heritage, often in an advanced level of material and structural decay, is also part of the historical memory of Sardinia evoking myths and legends that still survive in the cultural tradition of the island. In particular, the Domus de Janas are a major and significant part of the cultural heritage of Sardinia, not only for their historical-archaeological value, but also due to their wider distribution across the island, forming an integral part of the Island's identity and landscape. The artistic motifs, present in the shelters and hypogea, support art and crafts, and the wording Domus de Janas, "House of the Fairies", has an important connotation. This name comes from the stories related to the magical creatures that were believed to inhabit those prehistoric structures.

Among this complex and rich heritage of necropolis, two archaeological case studies have been selected for this paper owing to their representativity and challenges. The first case is the Necropolis of S'Acqua Salida and Corongiu, located on small Quaternary sandstone hills in the territory of the municipality of Pimentel (South Sardinia) in the Trexenta landscape (Figure 1b:27 and Figure 2). Two agglomerations of tombs can be identified: S'acqua Salida and Corongiu. The necropolis of S'acqua Salida has numerous Domus de Janas, most of which are currently covered. The site is divided into two areas, located 150 metres apart (Figure 2): the first (complex A) consists of Domus de Janas of the 'horizontal projection' and 'pit' type, while the second (complex B) is of Domus de Janas 'pit' type.

Figure 2: The Necropolis of S'Acqua Salida and Corongiu in Pimentel: from the left, location within Sardinia; Aerial photographic survey of complex A; Aerial photo of complex B.

As a result of the numerous violations occurred in the necropolis of S'Acqua Salida over time, today it appears to have significantly changed from its original configuration. This is due to its direct exposure to the weather, the damage of mining work and illicit excavations that have occurred in the area by grave robbers. In the case of the Corongiu necropolis (Figure 3), it can be seen how the landscape has been distorted due to anthropic transformations, creating elements of degradation such as a dump placed at the back of the tomb, the presence of tracks and the remains of ploughing equipment. These emblematic funeral structures with their introverted character constitute a sign of an indissoluble bond with the earth and the search for the intangibility of the soul; although they have been violated for a long time, the current layout and geometry/curved compartments and convex ceilings are still legible in the original configurations, preserving the sorrowful and funerary atmosphere. However, the sandstone sedimentary rock in which the tombs were excavated is particularly sensitive to degradation and alteration, phenomena that are slowly transforming its precious surfaces. In this site, different types of decay produce profound transformations on the material over time, these require careful analysis in order to select appropriate interventions to restore, as much as possible, the original dignity and beauty of these Sardinian burial structures. The site is a unique case for this study as it has been excluded by the UNESCO tentative list because of the complexity of its location on private ownership land which makes it mostly inaccessible.

Figure 3: The Necropolis of S'Acqua Salida and Corongiu in Pimentel: from top left, aerial view of the necropolis of Corongiu, Pimentel; views of the complex A; interiors of the complex B.

The second case is the Necropolis of Montessu in Villaperuccio, a site excavated in an amphitheatre of trachytic rock on the southern flank of the Sa Pranedda Hill. This is one of the most significant and fascinating pre-Nuragic testimonies of the island, in use for a millennium and a half, from the Final Neolithic (3200 - 2800 B.C.) to the Antique Bronze Age (1800 - 1600 B.C.). The necropolis consists of thirty-five tombs, dug into the rock and arranged in groups along the slopes of two natural hills: Su Craibi and Su Cungiau de Pittanu (Figure 4).

Figure 4: The Necropolis of Montessu in Villaperuccio: from the left, location within Sardinia; Aerial photo of the village Villaperuccio and necropolis of Montessu; Aerial photo of the necropolis of Montessu.

The domus that make up this necropolis are of the single or two cellular types, with flat or semi- domed roofs; they are formed by a vestibule and a main chamber, with several niches or chambers, arranged on horizontal plans. Most of the tombs are characterised by decorative motifs, engraved into the interior walls of the cells (Figure 5). These motifs include taurine horns, representing the god Taurus, symbol of fertility, spirals as an emblem of the Mother Goddess to represent rebirth, wolf's teeth in red ochre, festoons, curvilinear candle-stick motifs and a false door, indicating the passage to the afterlife. In contrast to the other site, which is totally isolated and not musealised, the Necropolis of Montessu presents a careful musealisation, which involves the protection and restoration of the Domus de Janas, counteracting important degradation phenomena. The existing protection strategy includes the creation of paths with directions leading to the various monuments as well as the insertion of information panels and lighting systems to ensure understanding of the site and good visibility respectively. Overall, these Domus de Janas are in a good state of preservation, with the exception of a few cases in which the hypogea are not usable or no longer maintain their original configuration, due to anthropic degradation. Most of the burial structures are present in the original layout, with inscriptions, and decorated ceilings, which support the preservation of the funeral aspect of the domus.

Figure 5: The Necropolis of Montessu: from the top left, tomb II; view of the valley; tomb VII; figurative motif detail of Tomb XXXIV; motifs of taurine horns; tomb's entrance

3. Methodological Approach, Research Methods, and philosophies

To facilitate this exploration, the research team introduced the "Co-creation Perspectives of Archaeological Conservation Proposals (Italy-UK)" workshop between students and academics from the University of Cagliari, Italy, and the University of Portsmouth, UK, as well as local stakeholders and professionals. The workshop means to develop archaeological conservation perspectives for the two selected Domus de Janas sites (Necropolis of Montessu in Villaperuccio and Necropolis of S'Acqua Salida and Corongiu in Pimentel) and to produce conceptual conservation plans including strategies for restoration, accessibility, material and structural conservation, interpretation, protection and musealisation. Theoretical understanding of the sites' history, key cultural significance and values as well as wider contexts will drive the co-production of these proposals. This 4-day workshop was designed for students and academics from both countries to work with local stakeholders

and professionals in developing conservation design strategies and visions for the sites. Therefore, the 'speed-dating' technique was used to encourage students and academics to form working groups based on their interest, disciplines and possible inputs with each group ideally having representatives with archaeology and architecture expertise, as well as members from both countries. Following this, the workshop progressed by using relevant research methods (e.g. archival research, architectural analysis and co-creation). The methodological approach was developed according to the tools defined in the UNESCO Recommendation on the Historic Urban Landscape with a focus on civic engagement and knowledge and planning. These tools "should facilitate intercultural dialogue by learning from communities and by facilitating mediation and negotiation between groups with conflicting interests" Article 24 (a) (UNESCO, 2011). Ministry of Culture experts informed the historic and empirical analysis of the selected sites and shared their expertise about the sites challenges and opportunities. In addition, CESIM² - Centro Studi "Identità e Memoria" provided all the materials for understanding the sites, their history, and current state of conservation. Local councils of the two sites and the archaeological museum of Montessu in Villaperuccio provided access to the sites and the expertise of their historians and archaeologists. A group of local technicians/engineers provided the 3D models of the sites, integrating morphological and geometrical characteristics as well as structural challenges. All involved actors were fully involved in the co-creation workshops, which fostered comprehensive understanding and responses.

Archival research and document analysis methods were employed to develop the theoretical understanding of the sites' history, archaeology and values. This was done by analysing historical studies, archaeological and architectural reports, structural and decay studies, and policies local to the sites. In addition, an architectural and contextual empirical study (Figure 6) was carried out in groups to contextualise the archival and historic information and the theoretical understanding by each group; in addition, the analysis aimed to investigate the sites' characteristics, opportunities and challenges, to immerse the working groups with the physical, cultural and archaeological landscape, and to encourage onsite discussions and brainstorming. This empirical study was supported by a focus group discussion with local stakeholders, professionals and site managers to make sure that the working groups consider the wider issues highlighted by these groups. This provided a more in-depth insight to the sites' contemporary values, meanings and problems. Three key themes of issues (and response) emerged, which are 1) accessibility, 2) materials and structural conservation, and 3) protection, interpretation and musealisation. These were identified as part of the methods and through discussions with local authorities, site managers and institutions. Following that, students were asked to pick the site with issues related to their interest and academic and professional expertise.

Figure 6: Site visits and empirical studies in the Necropolis of Villaperuccio and Pimentel.

After data collection by the groups, co-design workshops (Figures 7&8) were held to envision conceptual designs that contribute to the sites' conservation solutions and strategies. The Double Diamonds method (Tschimmel, 2012) was used to structure the co-creation/co-design process, foster design thinking through its four steps (discover, define, develop, deliver), and identify focused problems and solutions. As a result, the outputs of the co-design workshop (mainly conceptual designs and strategies) are analysed considering the sites' values and challenges.

The philosophy of this study takes archaeological conservation as a suitable concept for the recognition and display of the cultural property of heritage (Berducou, 1996). It is very important to note that the values possessed by the items and sites being investigated are the clues on which all studies will depend. In this vein, conservation, design and archaeology should not be separated, as they are in fact conjoined subjects (Matero, 2006). Testing the influence of archaeology on the outcomes of conservation design experimentation as part of this workshop is achieved by considering some exemplary principles such as contextualisation, diachronic continuity, enlarging the scale of protection and theoretical dependency. The contextual relationships are even more important when the object contains more than one meaning, the so-called polysemy of the object. In this context, Antonios Keramopoulos, who was a Greek archaeologist, insists on the importance of considering spatial, geographic and diachronic aspects of archaeology, which help achieve authentic interpretation of the past (Hodder, 1991). This enables the understanding of the relationships between successive periods/structures (Shanks, 2003) as well as contextualising the design and conservation strategies and their contribution to the whole site (Matero, 2006).

Figure 7: Co-creation/Co-design workshops at the University of Cagliari, Italy, 2023

Figure 8: Co-creation/Co-design workshops at the University of Cagliari, Italy, 2023

4. Co-design Conservation outcomes analysis

The "Co-creation Perspectives of Archaeological Conservation Proposals (Italy-UK)" workshop and its co-design process resulted in four key strategies that can be summarised as follows:

4.1. Navigation for Protection – The spiral intervention

Through working on the Necropolis of S'Acqua Salida and Corongiu in Pimentel, the team started outlining the values and key problems of these funeral structures. The team noticed a lack of protection against current environmental issues, human interference (such as carving names and symbols), and a lack of a specific strategy for navigating in and around the site. Caused by a lack of protection, as well as some Roman interventions, many of the previously covered tombs were opened resulting in collection of rainwater inside the structure, growth of fauna, and allowing unmanaged access from both humans and animals. From a conservation standpoint, the site landscape is gradually confused/innavigable and the physical quality of the site as an example of a Neolithic burial structure is degraded via erosion from water, vegetation, roots, and continuous trampling, resulting in the fragile sandstone to lose quality and form. In general, there is no clear navigation and accessibility strategy. Owing to growing vegetation and rocky outcrop around the structures, accessibility is difficult especially for people with mobility or disability requirements.

² <https://www.cesimsardegna.com/>

Before any design strategy, the proposal, brought by a group of architects, conservation specialists and archaeologists, indicates the need for preservation and maintenance (i.e. clearing the existing fauna and human debris) and the continuation of the archaeological excavation of the surrounding area in order to consolidate any interpretations with authentic physical remains. The proposed conservation design concept by the team is driven by managing accessibility and navigation, protection from rainwater, and enabling the musealisation of internal structures and their landscape. Therefore, a domed structure was proposed, covering the large openings of the tombs; inspired by the Neolithic ornament symbols found in the tombs, the breathable but rain-proof dome takes the shape of a spiralled glulam timber structure infilled with polycarbonate openings in order to preserve visual access into the structure whilst preventing unmanaged access of rainwater, people and animals. The spiral structure continues with a levelled platform that would incline smoothly, suitable for wheelchair users, creating a smooth and accessible walking surface for those with mobility issues (Figure 9&10). The lighting strategy of the proposal is informed by the Neolithic “Coppella”, small remains in the ground that are speculated to have held ritual fires. It was suggested that a non-invasive and removable chemical bonding process could be used to create a lighting strategy, with red lights indicating little safety and yellow indicating a well accessible environment (Figure 10). The overall strategy indicated how archaeological knowledge and conservation skills in the team have informed the way the designers responded to the established narratives, values and challenges.

Figure 9: The spiral intervention proposal conceptual drawings (produced by Team 1: Jackie Deverrell, Deena Mughal, Iulia Buturuga, Stephania Casula)

Figure 10: The spiral intervention proposal conceptual drawings (produced by Team 1: Jackie Deverrell, Deena Mughal, Iulia Buturuga, Stephania Casula)

4.2. Immersive Shelters Network

The team worked on the Necropolis of Montessu in Villaperuccio and focused their work on protection and musealisation issues. The problems of the site were categorised according to related scales (tomb, site, and region). Key problems highlighted are visualisation, humidity, erosion, vegetation, signage, circulation, navigation, and mobility via the topographic terrain. The interior of the chambers is currently exposed to continuous and direct contact with stagnant water which makes the issue of moisture more damaging to these structures.

From a landscape perspective, and inspired by the landscape expertise in the team, key viewing points were identified with the ability to view structures, landscape and the whole area; a circulation route was proposed to connect these points, encouraging heritage narratives throughout the landscape. The strategy includes the restoration of an old dilapidated road leading to the main tombs with simple paving intervention to allow wheelchair access to the tombs.

From an individual structure perspective, the team supported by historians and conservation members concluded that the Neolithic period tombs were later altered by successors in the Chalcolithic and Bronze Age periods. The Romans also intervened with the tombs. Therefore, all layers should be preserved together with key interpretations installed on site and on the viewing points according to the views they frame.

A conceptual design of a barrel canopy was proposed (Figure 11) to provide a clear entranceway and to protect the tomb structures. Designers were supported by structural engineer members of the team to design the canopy and its structural strategy. A light, prefabricated and removable concrete foundation was proposed to place the canopy on; the team suggested steel rods connected to the sites rocky geology to support the structure. The design iterations of the canopy allowed the team to identify key components such as rotating cladding materials (e.g. pine shingles) to control light, rain and ventilation and provide better protection from the environment. The shingles will be charred for better resistance to moisture and deterioration. Etched into some of the charred pine shingles will be the symbols of the mother goddess, bull horns and the circle of life to preserve key archaeological, artistic and historic values of the site and its tombs.

Figure 11: The Immersive Shelters Network proposal conceptual drawings (produced by Team 2: Harry Philipson-stow, Majid Sallomi, Laxhaan Sunderakanthan, Suren Patel, Nicolo Steri, Pierluigi Spano, Nicolo Steri, Elisabetta Mannai)

4.3. Different levels of embodied experience with archaeological objects

Considering the 35 tombs of the Necropolis of Montessu in Villaperuccio, the team focused on material and structure protection and accessibility of the site, informed by archaeological research and conservation concepts and theories. The process of natural erosion, the impact of human erosion, and ultimately the lack of informed experience and understanding of the history and values of the archaeological site were highlighted as key problems. The team proposal emphasises the need to ensure that understanding of the site’s history and values can be communicated while the audience moves around and into the structures. This will involve a strategy to prevent human erosion, a noticeable factor of decay within the site.

Ensuring accessibility to the site to monitor and document the process of decay is crucial to allow for this natural process to occur in a curated manner. Archaeological academics from the University of Cagliari as well as archaeological and geological experts from CESIM supported the development of this conservation approach. Architectural intervention is also necessary to allow for accessibility into the site and for the narrative experience of the Domus de Janas to be enhanced. Therefore, design and conservation students proposed a pathway to allow for an informed experience across all structures. The contrast between new and old re-establishes the harmony between life and death, allowing the existing fabric to speak to the audience in its authentic state. This ensures that the story can be communicated, setting in motion new stories to be told.

The proposal named “Memories of the Future” suggests three levels of access to experience the tombs while monitoring human impact and experience (Figure 12&13). Level 1 manages the natural process of decay by allowing for no access to the tomb structures with a raised pathway

allowing individuals to experience the process of decay from a distance. Level 2 allows for partial access for individuals to view inside the tombs that still exist mostly underground from this raised pathway. Level 3 facilitates for immersed engagement, allowing individuals to experience stepping into the sacrificial area of the tomb via a stair. The proposed staircase/ramp for inclusive access, allows for level 3 access to occur following the original ritual practice and enables visitors to appreciate the existing structures. Tombs 33-35 were used to illustrate these levels of access; Tomb 35 was highlighted as structurally damaged, 33, 'the shrine tomb', is more accessible, with more visible changes, and 34, 'the tomb of horns', sitting in between the two, highlighted the necessity of allowing for partial access (Figure 12). These levels of access can be applied to the wider site and its structures.

325

326

Figure 12: The Memories of the Future proposal conceptual drawings (produced by Team 3: Cerian Mair Frost, Louis Marks, Lily Ward, Abigail Ogden-Metherell, Antonio Tamburini, Giuseppina Pinna, Raffaele Serreli)

329

330

Figure 13: The Memories of the Future proposal conceptual drawings (produced by Team 3: Cerian Mair Frost, Louis Marks, Lily Ward, Abigail Ogden-Metherell, Antonio Tamburini, Giuseppina Pinna, Raffaele Serreli).

4.4. Ecology vs Archaeology: Frame of Life

This group aims to place frames in the landscape of the Necropolis of Montessu in Villaperuccio to signify the connection of life and death. The aim is to facilitate accessibility of visitors' emotional and physical link to the Domus de Janas (House of Fairies). Following the site visit and empirical analysis, the problems of physical and intellectual accessibility, especially the access inside and around the various tombs as well as understanding of the knowledge and history of the tombs, took priority in the group's evaluation and proposition. The area with the tombs was also visually disconnected from the historic and new town.

As a result, the proposal indicates the need for three forms of connections: visual, physical, and symbolic/intellectual. These would connect three elements: tombs, water tower/old town, and contemporary town. Maintaining a strong relationship between these elements is important to contextualise the tombs' heritage within the overall history and values of the area and its historic layers. This proposal was developed through different scales, from macro (landscape) down to architectural and then to specific micro scale (the tomb) (Figure 14).

At landscape scale, the proposal intends to create a better connection and enjoyable journey between the local town and the site. Thus, a wider path along an existing road which flows adjacent to all of the tombs was proposed. Specific points of the pathway were selected to host structures for rest and engagement with heritage information (Figure 15&16). The orientation of these structures follows the intended landscape and tombs' views to be created. Visibility and improving visitors sight of the landscape but also the inside and outside the tombs were key drives to this proposal. To visually reconnect the visitors to the site, totems (information stations) which explain the tombs and the history of the place, and structures to frame the view and allow visitors to pause and reflect on the environment around them were designed. The structures placed around the landscape are called 'Recharge', have different sizes and purpose which intentionally makes the visitor react differently in each place: 1) Big structures - recharge the soul: place for meditation and privacy, 2) Medium structures - recharge self: place for a pause and break, and 3) Small structures - recharge the mind: place to relax and view the scenery.

352

353

354

Figure 14: The Frame of Life proposal conceptual drawings (produced by Team 4: Amber Say, Joe Brandreth, Rebecca Rowan, Zuzanna Cwikla, Nicole Bellu, Sara Cavada, Chiara Serreli)

357

358

359

Figure 15: The Frame of Life proposal conceptual drawings (produced by Team 4: Amber Say, Joe Brandreth, Rebecca Rowan, Zuzanna Cwikla, Nicole Bellu, Sara Cavada, Chiara Serreli)

362

363

364

Figure 16: The Frame of Life proposal conceptual drawings (produced by Team 4: Amber Say, Joe Brandreth, Rebecca Rowan, Zuzanna Cwikla, Nicole Bellu, Sara Cavada, Chiara Serreli)

5 Discussion and Conclusion

The Domus de Janas represent a significant testimony of extraordinary conservation and exceptional balance established over the millennia between historical artefacts and the natural environment. This invaluable heritage asset constitutes places of strong connection between modern communities and their ancestors, with deep emotions, related to myths and legends still alive, conveyed from generation to another. For this reason, design for valorisation and conservation cannot deny the intangible historical and contemporary social values of this heritage asset. Therefore, the conservation of the material is an indispensable premise for the preservation and transmission of the intrinsic values of

these monuments. Considering this, particular attention was paid to the study of the material aspects and the analysis of the state of conservation of the monuments, not only in relation to the conservation of the surfaces, but also in terms of the structural safety and landscape integrity.

The conservation proposals and strategies that resulted from this study were able to provide a consistent summary of the main factors of alteration and degradation, and through critical interpretation of the results it was possible to provide alternative visions for the interpretation of the monuments and their accessibility. Through fieldwork and co-creation workshops, participants were able to map the overall state of conservation of the monuments, and identify relevant categories of intervention to be implemented based on the nature and state of conservation of the individual site. At the same time, the proposals together were able to outline the framework of risk factors and their possible impact on conservation; collectively the proposals address a summary of the main interventions necessary for the protection and enhancement of the monuments at different scales. Considering the archaeological nature of the monuments, the state of conservation of the considered *Domus de Janas* is very good, except for some critical situations where adequate consolidation and restoration interventions have already been planned. Some alterations, such as patinas, are to be considered compatible with the conservation of the monuments and with the protection of the landscape values of the selected sites.

The present paper proposes a methodology to determine the state of conservation and structural safety of the *Domus de Janas*. The methodology is based on documentary collection, survey and empirical analysis, and proposals for conservation and sustainable use of the monumental sites. Given the specific nature of the *Domus de Janas*, that are dug into the rock, the hydrogeomorphology of the site significantly affects the type and extent of both surface degradation and static instability; therefore, the proposed methodology and outcomes demonstrate the positive impact of integrating inputs from diverse communities and disciplines (such as design, conservation, structural analysis, geology, archaeology, geotechnics, and materials pathology) on the conservation of and engagement with archaeological sites. In summary, the outcomes achieved through the application of the methodology testify the contribution of such a collaborative process to archaeological conservation in an effective timing and with comprehensive and well-rounded evaluations and strategies. Through the 4-day workshop, the application of the methodology helped in developing:

- An overview of the prehistoric sites and their evolution through the collection of documents.
- Determination of the current state of conservation of each site.
- Identification of the causes of the degradation and damage.
- Understanding of the sites within their wider tangible and intangible values.
- Linking tangible heritage to intangible values including contemporary narratives.
- Proposals of measures and actions aimed at the protection, conservation, musealisation and sustainable use of the sites.

The central aspect to be emphasised is the multidisciplinary approach of the proposed methodology (co-creation), which required the integration of the various aspects involved, such as conservation, structural safety, geotechnical and hydrogeological risks, interpretation and design in order to obtain a complete and exhaustive picture of the state of conservation of the *Domus de Janas* and their future. This co-creation has facilitated a multidisciplinary approach; with the mix and nature of expertise in each group resulting in a unique diversity in the focus of the conservation strategies, their scales and architectural/design interventions among the groups.

The methodology and the resulting proposals highlighted the power of design experimentation and co-creation in linking archaeology to anthropology to inform the sustainable conservation, adaptive reuse and tourism strategies of the sites. Through the activities of this study, the team were able to extend the discourse of the co-creation beyond the conservation of the tangible archaeological heritage and engaged more with questions related to the use, the people and the rituals associated with this heritage asset. These new questions were natural results of the embodied experience participants had during the empirical study through which they experienced landscape, architectural and interior scales; the site visit/empirical analysis enabled participants to explore questions arose from archival research within the physical context of the *Domus de Janas* landscape, architecture and interior features. As a result, the four proposals, although looked at different sites and problems, brought new architectural and landscape readings of the sites and creative proposals to experience, musealise and protect the sites at different scales.

The concept of resilience was discussed across all proposals. This concept has been discussed within different contexts, often referring to a 'system' which is able to withstand "*disturbances and still retain its basic function and structure*" (Walker & Salt, 2012, p.1). It can be argued that the effect of water penetration and decay is a slow process (as evident by patina of age) and therefore does not impact the resilience of these tombs compared to the extent of human erosion, a greater disturbance to the site. The patina of age on the stone is evidence of this tangible resilience but also of the intangible values that exist in the layers of patina on the stone. The *Domus de Janas* is part of the landscape, revealing layers of history and patina of time; unveiling these layers brings to life the tangible and intangible value, enhancing the perception and experience of the landscape in addition to the *Domus de Janas* themselves. Curated decay (DeSilvey, 2017) suggests that a building has a life and that at its end a dignified death should be allowed. '*It may be that in some circumstances a state of gradual decay provides more opportunities for memory making and more potential points of engagement and interpretation, than the alternative*' (DeSilvey, 2017). The *Domus de Janas* are living artefacts, open to the processes of growth, change and decay similar to any other living being; therefore, proposals for their authentic experience should accept decay as part of the tangible and intangible values.

From a wider perspective, the article and its proposals clearly articulate the power of the existing landscape as part of the conservation and adaptive reuse strategies for archaeological sites. The landscape is a natural amphitheatre, which allows for the tombs to be curated and seen from across the site. The purpose of *Domus de Janas* was to hold the deceased for 9 months with the form of the tombs symbolising a mother's womb, bringing forward the idea of rebirth. Embedded in a wild and natural landscape, the revitalisation proposals of these structures have suggested to empower the role of this landscape to foster emotional experience linked to ancestors and act as an authentic museum that curates the protected artefacts, the tombs. As part of the design proposals to achieve these objectives, materials used for the structures and paths are natural, mainly timber, reflecting the landscape and its sensitivity. This is also in line with preventing any further decay to the landscape and the tombs because of the suggested interventions.

The co-creation methodology enabled participants to recognise the connection between architectural practice and the cultural aspect of the place, while the cross-cultural/borders co-design has influenced original insights through overlapping theoretical and practical solutions and experiences

identified from each context. Participants have benefited from the structural process of co-design (Double Diamond Method) to develop divergent solutions anchored to their interpretation of material culture, landscape and archaeological objects (the tombs), while the co-creation helped in the development of a consistent proposal per team, based on their different **interpretations and expertise**. The epistemological ground and type of knowledge of these archaeological objects and natural and social context influenced the architectural approach to revitalise the different scales of this archaeology. This is mainly powered by the interdisciplinary nature of this workshop. Therefore, it can be argued that achieving coherent preservation, presentation and development strategies for heritage sites **not only depends** on the richness of information, analysis and material culture, but also **on** the interdisciplinary and co-creative perspectives that develop new ways of looking at heritage sites by overlapping the interest of different disciplines, **stakeholders** and communities and by **using** participatory methodologies and tools.

Acknowledgement:

Bibliography

- Agnew, N., & Bridgland, J. (2006). *Of the Past, for the Future: Integrating Archaeology and Conservation*: Getty Conservation Institute.
- Agnew, N., Demas, M., & ICOMOS, C. (2002). *Principles for the Conservation of Heritage Sites in China: English-language Translation, with Chinese Text, of the Document Issued by China ICOMOS*: Getty Conservation Institute.
- Berducou, M. (1996). Introduction to archaeological conservation. In: A. M. Vaccaro, N. Stanley-Price, & M. K. Talley (Eds.), *Historical and Philosophical issues in the conservation of cultural heritage*. (pp. 248-259). Los Angeles: Getty Institute.
- Blomkamp, E. (2018). The promise of co-design for public policy 1 *Routledge handbook of policy design* (pp. 59-73): Routledge.
- Bollwerk, E., Connolly, R., & McDavid, C. (2015). Co-creation and public archaeology. *Advances in Archaeological Practice*, 3(3), 178-187.
- Carbonara, G. (1996). Teoria e metodi del restauro. *Carbonara, Giovanni (diretto da), Trattato di restauro architettonico, Utet, Torino, 1*, 1-107.
- Carbonara, G. (2012). An Italian contribution to architectural restoration. *Frontiers of Architectural Research*, 1(1), 2-9.
- DeSilvey, C. (2017). *Curated decay: Heritage beyond saving*: University of Minnesota Press.
- Fredheim, L. H. (2019). *Sustaining public agency in caring for heritage: critical perspectives on participation through co-design*. University of York.
- Grcheva, O., & Oktay Vehbi, B. (2021). From public participation to co-creation in the cultural heritage management decision-making process. *Sustainability*, 13(16), 9321.
- Habiyaremye, A. (2020). Knowledge exchange and innovation co-creation in living labs projects in South Africa. *Innovation and Development*, 10(2), 207-222.
- Hodder, I. (1991). *Archaeological theory in Europe: the last three decades*: Routledge.
- K. Paswan, A., D'Souza, D., & K. Rajamma, R. (2014). Value co-creation through knowledge exchange in franchising. *Journal of Services Marketing*, 28(2), 116-125.
- Lacedelli, S. Z., Fazzi, F., Zanetti, C., & Pompanin, G. (2023). From "exhibition" to "laboratory": rethinking curatorial practices through a digital experimental project. The case study of Dolomites Museum-Laboratory of Stories. *Herança*, 6(1), 158-183.
- Lin, M., Pereira Roders, A., Nevzgodin, I., & de Jonge, W. (2023). Values and interventions: dynamic relationships in international doctrines. Journal of Cultural Heritage Management and Sustainable Development.**
- Matero, F. G. (1993). The conservation of immovable cultural property: Ethical and practical dilemmas. *Journal of the American Institute for Conservation*, 15-21.
- Matero, F. G. (2006). Making Archaeological Sites: Conservation as Interpretation of an Excavated Past In: N. Agnew & J. Bridgland (Eds.), *Of the Past, for the Future: integrating Archaeology and Conservation* (pp. 55-63). Los Angeles The Getty Conservation Institute.
- Maye, L., & Claisse, C. (2022). Co-design within and between communities in cultural heritage: Current and open questions (Vol. 7, pp. 1): MDPI.
- Orbasli, A. (2008). *Architectural conservation: principles and practice*: Blackwell Science (UK).
- Phillips, R., & Gant, N. (2021). Engaging Design-Empowering Beyond 'Participation' For Active Engagement. *Research in Arts and Education*, 2021(1), 23-49.
- Ross, D., & Saxena, G. (2019). Participative co-creation of archaeological heritage: Case insights on creative tourism in Alentejo, Portugal. *Annals of Tourism Research*, 79, 102790.
- Ruskin, J. (1892). *Seven lamps of architecture. 1892* (Vol. 17): Charles E. Merrill.
- Shanks, M. (2003). *The Classical archaeology of Greece: experiences of the discipline*: Routledge.
- Tanda, G. (2000). *L'ipogeismo in Sardegna: arte, simbologia, religione*. In: *L'ipogeismo nel Mediterraneo: origini, sviluppo, quadri culturali*. Paper presented at the Proceedings of the International Conference, 23-28 maggio 1994, Sassari-Oristano, Italy, Sassari. P. 399-425.
- Tanda, G. (2021). *Le domus de janas decorate con motivi scolpiti*. Cagliari.
- Tanda, G., Doro, L., Usai, & Buffoni. (2023). *Arte e architettura nella preistoria della Sardegna. Le domus de janas*: Condaghes.
- Tschimmel, K. (2012). *Design Thinking as an effective Toolkit for Innovation*. Paper presented at the ISPIM Conference Proceedings.
- UNESCO (2011) UNESCO Recommendation on the Historic Urban Landscape.**
- Walker, B., & Salt, D. (2012). *Resilience practice: building capacity to absorb disturbance and maintain function*: Island press.