

# HERITAGE 2022 INTERNATIONAL CONFERENCE VERNACULAR HERITAGE: CULTURE, PEOPLE AND SUSTAINABILITY

Eds. C. Mileto, F. Vegas, V. Cristini, L. García-Soriano



# **VERNACULAR HERITAGE: CULTURE, PEOPLE AND SUSTAINABILITY**

Eds. C. Mileto, F. Vegas, V. Cristini, L. García-Soriano



Universitat Politècnica de València

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### **HERITAGE 2022**

#### **International Conference on Vernacular Heritage: Culture, People and Sustainability**

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## Preface

**C.Mileto, F. Vegas, V. Cristini, L. García-Soriano**

Research Centre for Architecture, Heritage and Management for Sustainable Development (PEGASO),  
Universitat Politècnica de València, Valencia, Spain

“HERITAGE2022, International Conference on Vernacular Heritage: Culture, People and Sustainability” is organized in the framework of the “VerSus+ | Heritage for PEOPLE” project, co-funded by the Creative Europe Program of the European Union (grant 607593-CREA-1-2019-1-ES-CULT-COOP1) and led by Universitat Politècnica de València (Spain) in partnership with Università degli Studi di Firenze and Università degli Studi di Cagliari (Italy), CRATERre – ENSAG (France) and Universidade Portucalense - Departamento de Arquitetura e Multimédia Gallaecia (Portugal). The “VerSus+ | Heritage for PEOPLE” project focuses on the transmission of knowledge to communities and the general public. It pays special attention to the society of the future (children and young people), as well as local, regional and national authorities in charge of heritage management, and includes specialists and experts in the field of architecture (architects, engineers, cultural managers, historians, ethnographers, university students, etc.) together with craftsmen and companies in the construction and tourism sectors, cultural and social associations, and educational institutions.

Vernacular heritage is a tangible and intangible heritage of great importance to European and global culture. This architecture, born from the practical experience of local inhabitants, makes use of local materials to erect buildings taking into consideration the climate and geography, developing cultural, social and constructive traditions based on the conditions of the surrounding nature and habitat. Above all, it plays an essential role in contemporary society as it is able to teach us important principles and lessons for a respectful sustainable architecture. These lessons from vernacular heritage for contemporary architecture have been extensively studied in the “VerSus: Lessons from Vernacular Heritage in Sustainable Architecture (grant 2012-2792/001-001 CU7 COOP7)” project, co-funded by the European Union between 2012 and 2014, and the “VerSus+ | Heritage for PEOPLE” (2019-2023) project, which follows on from the previous project, focusing on the transmission of this knowledge to society, as seen earlier. The wisdom of vernacular architecture in the field of environmental, sociocultural and socioeconomic sustainability is increasing both in interest and significance in the world today. Climate change, depopulation and the pressure of tourism all pose major challenges, as do the increasingly rapid social changes and loss of traditional trades resulting from the industrialization of the construction process. These challenges alert us to the pressing and growing need for education and increased awareness in society and for the documentation and conservation of architecture within a framework of up-to-date integration into contemporary life, managing territory and heritage assets for the sustainable development of society in the future.

The second project involved in this conference is “RISK-Terra. Earthen architecture in the Iberian Peninsula: study of natural, social and anthropic risks and strategies to improve resilience” (RTI2018-095302-B-I00) (2019-2022), funded by MCIU (Ministerio de Ciencia, Innovación y Universidades), AEI (Agencia Estatal de Investigación), FEDER - UE (Fondo Europeo de Desarrollo Regional, Unión Europea). This project is geared towards the conservation of earthen architecture in the Iberian Peninsula, both monumental and vernacular, which continues to be undervalued and barely recognized. The RISK-Terra project aims to provide scientific coverage of the study of natural threats (floods, earthquakes, climate change), social threats (abandonment, social discredit, demographic pressure, tourist development), and anthropic threats (neglect, lack of protection and maintenance), as well as the mechanisms for deterioration

and dynamics and transformation (replacement, use of incompatible techniques and materials, etc.) to which architecture is exposed. The objective of the project is to establish strategies for conservation, intervention and rehabilitation which allow the prevention and mitigation of possible damage through compatible actions and/or actions to increase resilience.

As these two projects have major points of contact, particularly in relation to the challenges mentioned above, with potential for common reflection, their main themes have been combined in this Heritage2022 conference. The topics established for the conference are: 1. vernacular architecture: matter, culture and sustainability (study and cataloging of vernacular architecture; urban studies of vernacular architecture; studies of traditional techniques and materials; sustainability of vernacular architecture); 2. heritage education (research in heritage education; heritage education and social inclusion; heritage communities; creativity and heritage education); 3. artisans and crafts of traditional construction (intangible heritage: the management of know-how and local construction culture; training in traditional construction crafts; tradition and innovation in traditional construction crafts; plans and experiences for the recovery and maintenance of construction crafts); 4. conservation, restoration and enhancement of vernacular architecture (conservation and restoration projects of vernacular architecture; materials and intervention techniques for vernacular architecture; difficulties and possibilities of using traditional crafts in conservation; management and maintenance of vernacular architecture).

The scientific committee was made up of 102 outstanding researchers from 24 countries from the five continents, specialists in the subjects proposed. All the contributions to the conference, both the abstracts and the final texts, were subjected to a strict peer-review evaluation system by the members of the scientific committee. Out of the 200 proposals submitted, 134 papers by 254 authors from 25 countries from the four continents were chosen for publication. All the articles have been published in print and online in the two-volume book “Vernacular Heritage: Culture, People and Sustainability”.

“HERITAGE2022 (Versus+ | RISK-Terra), International Conference on Vernacular Heritage: Culture, People and Sustainability” was held from 15 to 17 September 2022 in in-person and online modality at the Universitat Politècnica de València. The conference was under the aegis of: ICOMOS-CIAV (International Scientific Committee of Vernacular Architecture); ICOMOS-ICICH (International Scientific Committee on Intangible Cultural Heritage); IEB (Instituto Español de la Baubiologie). The organization, publication and implementation of the conference have been made possible thanks to co-funding of the Creative Europe Programme of the European Union for the project “VerSus+ | Heritage for PEOPLE” (grant 607593-CREA-1-2019-1-ES-CULT-COOP1); and the MCIU, AEI and FEDER - UE for the research project “Risk-Terra. Earthen architecture in the Iberian Peninsula: study of natural, social and anthropic risks and strategies to improve resilience” (ref.: RTI2018-095302-B-I00). Furthermore, Escuela Técnica Superior de Arquitectura and PEGASO - Research Centre for Architecture, Heritage and Management for Sustainable Development of Universitat Politècnica de València have also contributed to the whole project.

Finally, we would like to thank all the authors who contributed to the quality, range, diversity and richness of these publications with their articles. We give special thanks to all the partners of the European project “VerSus+ | Heritage for PEOPLE” and the national research project “Risk-Terra” for participating in the conference and helping to spreading the word about it worldwide. We are grateful for the aid of all the members of the advisory committee and the scientific committee for their work throughout the process of revising the abstracts and papers. And, above all, we thank the organizing committee for the complex setting up of the whole conference, the style and language reviewers for their corrections, and all the collaborators for their invaluable work in the management and organization of all stages of the process.

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# Table of contents

Preface.....	I
Organization and Committees .....	IV
Conference Support.....	VIII

## PLENARY LECTURES

A Vision for CIAV. Addressing the challenges facing the ICOMOS International Scientific Committee on Vernacular Architecture .....	3
<i>H. Mahdy</i>	
The National Plan for Traditional Architecture as a safeguarding tool. Action programmes and projects .....	11
<i>M. P. Timón Tiemblo, E. Agromayor Navarrete</i>	

## VERNACULAR ARCHITECTURE: MATTER, CULTURE AND SUSTAINABILITY

### STUDY AND CATALOGING OF VERNACULAR ARCHITECTURE

The standardisation of vernacular architecture. Wine buildings in Andalusia .....	23
<i>J. Aladro-Prieto, F. J. Ostos-Prieto, M. Murillo-Romero</i>	
Vernacular architecture in Brazilian semiarid region: survey and memory in the state of Sergipe .....	31
<i>D. Felix Andrade, M. A. Penido de Rezende, S. Araújo Lima Bessa</i>	
Knowledge and conservation of Mediterranean spontaneous architecture: some of the villages of the northern Tyrrhenian coast of Calabria .....	39
<i>B. Canonaco, F. Bilotta</i>	
Architectural and constructive characteristics of vernacular settlements in southern Italy: the Esaro's valley and the popular identity of some exemplary cases.....	47
<i>B. Canonaco, F. Castiglione</i>	
Spanish traditional architecture abandonment and destruction: an initial analysis of social risks, phenomena, and effects in earthen architecture.....	55
<i>M. Caruso, C. Mileto, F. Vegas, V. Cristini</i>	
A taxonomy of vernacular heritage in the mid-Adriatic: Landscape relations and architectural characteristics of the farmhouses in Tronto Valley (Italy).....	63
<i>S. Cipolletti</i>	
Traditional houses in the South-Western Iberian Peninsula: Themes for a cross-border comparative typological study .....	71
<i>A. Costa Rosado, V. Gómez Martínez, M. Reimão Costa, M. T. Pérez Cano</i>	

The Hameau de la Reine at Versailles and the reproduction of vernacular architecture.....	79
<i>D. Crispino</i>	
Vernacular architecture of the Amalfi coast: a medieval domus in Villa Rufolo in Ravello (Italy) .....	87
<i>E. De Feo</i>	
Architectural survey, realized with integrated methodology, of the complex of Walser houses in Alagna Valsesia, Italy .....	95
<i>A. Di Paola, S. Vecchio, G. Frosini, B. Verona, S. Garuglieri</i>	
Modern attitudes towards vernacular architecture. Works by the Italians Luigi Angelini, Alberto Alpago Novello, Ottavio Cabiati, Alessandro Minali .....	103
<i>M. M. Grisoni</i>	
Wind and the villages in Rincón de Ademuz, Spain .....	111
<i>W. Ji, C. Mileto, F. Vegas</i>	
Vernacular features in eclectic architecture from the tropics. An analysis by means of architectural survey .....	119
<i>M. Leserri, G. Rossi, M. Chaverra Suarez, S. Gómez Mejía</i>	
Configuring, building and inhabiting the house from a gender perspective .....	125
<i>M. Lidón de Miguel, C. Mileto, F. Vegas, A. Hueto-Escobar</i>	
Rediscovering tradition through representation: the vaulted house of the Amalfi Coast.....	133
<i>B. Messina, S. Morena, C. Ferreyra</i>	
Traditional dwellings and techniques of the First Indigenous Peoples of South Africa in the Eastern Cape.....	141
<i>M. Minguzzi, Y. Hernández Navarro, L. Vosloo</i>	
Rediscovered earth heritage becomes motor for local change The Guérande Peninsula (France) .....	149
<i>M. Miranda Santos, A. Hilton, P. Poullain, E. Hamard, C. Mouraud</i>	
Tradition and semantics: the case of Aeolian architecture.....	157
<i>S. Mollica</i>	
The Italian case of Leopoldine in Tuscany: methods and issues for the cataloguing of rural building heritage .....	165
<i>I. Nocerino</i>	
Highlighting the Heritage of Meseta Ibérica.....	173
<i>J. Pinto, A. Paiva, D. Almeida, S. Pereira, A. Antunes, R. Bento</i>	
A heritage to reveal and protect. Historical water-based paper mills and ironworks in Campania (Italy) .....	181
<i>S. Pollone</i>	
Architecture and Proto Industry. Watermills in the historic peri-urban landscape of Benevento (Italy).....	189
<i>L. Romano</i>	

An architectural catalogue for the study of traditional building features from their seismic behaviour in the 2016 Central Italy earthquake .....	197
<i>L. Sbrogiò, Y. Saretta, M. R. Valluzzi</i>	
Earthen vernacular architecture in flood-prone areas: characteristics and typologies in the Ebro basin.....	205
<i>F. Trizio, F.J. Torrijo Echarri, C. Mileto, F. Vegas</i>	
New studies for the knowledge of the vernacular characters of the ancient water mills in central Sicily .....	213
<i>A. Versaci, A. Cardaci, L. R. Fauzia, M. Russo</i>	
Identification and safeguarding of Central Sicily's forgotten vernacular heritage: elements of identity and memory .....	221
<i>A. Versaci, A. Cardaci</i>	
The particular ensemble of Mas d'en Segures: Functional and constructive analysis of a house and a barn in Tinença de Benifassà (Castellón, Spain).....	229
<i>J. Villasante Claramonte</i>	
In the shadow of Vesuvius. Sustainable and bioclimatic lessons from a vernacular heritage .....	237
<i>E. Vitagliano</i>	
<b>URBAN STUDIES OF VERNACULAR ARCHITECTURE</b>	
The rural founding villages of the Italian Agrarian Reform in Basilicata (1950-1970): urban planning and 'modern' vernacular architecture to the test of contemporaneity. The case of Borgo Taccone (MT) .....	247
<i>C. Achille, S. Bortolotto, E. Ciocchini, M. C. Palo</i>	
Vernacular architecture and written sources: the case study of the Tronto Valley .....	255
<i>E. Facchi, A. Grimoldi, A. G. Landi</i>	
Urban vernacular architecture in the Middle Ages in Galicia, Spain.....	263
<i>A. Fernández Palicio</i>	
Binibeca Vell. Interpreting tradition .....	271
<i>J. J. Ferrer Forés</i>	
Mapping spatial social aspects of urban recovery in contested cities: a case of the historic commercial center of the ancient city of Aleppo .....	279
<i>S. Ibrahim</i>	
Contributions of the vernacular heritage in the current city. Case study: Santo Domingo Neighborhood, Tuxtla Gutiérrez, Chiapas, Mexico .....	287
<i>A. Parra Zebadúa, M. Genís Vinyals, L. Ocampo García, R. Villers Aispuro, M. A. Zenteno Hernández, L. F. Escamiroso Montalvo, S. N. Zebadúa Velasco</i>	
The town of Collodi: the vernacular heritage.....	293
<i>F. Pisani</i>	

Between landscape and fortified architecture: traces and memory of rural civilization in the territory of Pesche in Molise .....	301
<i>M. P. Testa</i>	
Light Touch on the land – continued conversations about architectural change, informality and sustainability.....	309
<i>D. Whelan</i>	
<b>STUDIES OF TRADITIONAL TECHNIQUES AND MATERIALS</b>	
The stone as constant presence: vernacular structure of the cultural heritage of Porcuna (Andalusia, Spain).....	319
<i>S. Belmondo, P. Millán Millán</i>	
From natural to artificial: vernacular housing in the Spanish Caribbean .....	327
<i>B. del Cueto</i>	
Designing with water for climate change adaptation and cultural heritage preservation.....	335
<i>A. Elnokaly, W. Pittungnapoo</i>	
La Vera´s vernacular architecture. Structural design and climate protection in timber frame wall houses using constructive systems and local materials.....	341
<i>E. Franco Rodríguez, M. Bujalance</i>	
Traditional buildings for tobacco processing in Val Tiberina (Tuscany-Italy) .....	349
<i>F. Fratini, S. Rescic, M. Camaiti, M. Mattone</i>	
The parish church of San Michele Arcangelo in Metelliano: the path of knowledge of a vernacular architecture .....	357
<i>G. Ghelfi</i>	
Indoor air quality for sustainability, occupational health and classroom environments through the application of earth plaster .....	363
<i>M. I. Gomes, T. Miranda</i>	
The importance of water in traditional gypsum works.....	369
<i>B. González-Sánchez, W. Salazar Chuquimarca, J. R. Rosell Amigó, A. Navarro Ezquerria</i>	
State of conservation of half-timbered walls in Burgos (Spain): Quantitative analysis of material and structural degradation.....	377
<i>A. Hueto-Escobar, F. Vegas, C. Mileto, M. Lidón de Miguel</i>	
Adobe Constructions – Colonial Chilean House.....	385
<i>M. G. Jofré Troncoso</i>	
Favignana bio-calcarenite: technological culture, knowledge and recovery.....	393
<i>A. Mami, E. Caleca, E. Nicolini</i>	
Examination of earthen construction in archaeological sites of the Iberian Peninsula for risk analysis .....	401
<i>S. Manzano Fernández, C. Mileto, F. Vegas, V. Cristini</i>	

Traditional mortars with chucum in Yucatan, Mexico, as biocultural heritage .....	409
<i>M. M. Martínez-Barreiro, L. F. Guerrero-Baca</i>	
Dry Stone Wall Relics as a Part of Cultural Landscapes: A Case Study from the Foot of Mt. Hira Region in Japan .....	417
<i>C. Ochiai, J. Wang</i>	
The paving of ancient paths, testimony of an ancient culture: recovery of a traditional route in Genoa (Liguria, Italy) .....	425
<i>D. Pittaluga, S. Rescic, F. Fratini</i>	
Constructive and earthquake-resistant aspects of modelled-earth, a technique in ancient Peru .....	433
<i>H. E. Torres Peceros</i>	
Research on technique “Banzhu” used in traditional dwellings in China from the perspective of formwork .....	441
<i>Q. Zhou</i>	
<b>SUSTAINABILITY OF VERNACULAR ARCHITECTURE</b>	
Traditional Bukharian Houses and Mahallas: a shared vernacular heritage at risk.....	451
<i>N. Aituganova, O. Vileikis, S. Babaev, J. Ors Ausin</i>	
A look on the intrinsic sustainability of Aeolian vernacular architecture .....	459
<i>R. Caponetto, G. Giuffrida</i>	
The Z Free Home – inspired by vernacular architecture .....	467
<i>M. Dabaieh</i>	
Proposals for the sustainable recovery of dry stone buildings in Puglia, Italy.....	475
<i>S. Farina</i>	
Casa Nautilus Solar – Organic contemporary Architecture based on Vernacular Heritage.....	483
<i>P. Jebens-Zirkel Imm, A. J. Zirkel Zirkel</i>	
Making our Rural Landscape visible. A way to defend Anonymous Cultural Heritage.....	491
<i>A. Martínez Duran, M. Villaverde Rey</i>	
Shuar architecture as a model of sustainability .....	499
<i>D. E. Morocho-Jaramillo</i>	
Dry stone architecture: the survey as a tool to safeguard the risk of morphological or formal homologation .....	507
<i>G. Rossi, M. Leserri, A. Benitez Calle</i>	
At the roots of sustainability: Mediterranean vernacular architecture .....	513
<i>S. Talenti, A. Teodosio</i>	
Lessons from the past, architecture for the future. Coupling historic preservation with sustainable architecture .....	521
<i>P. Vitti</i>	

## HERITAGE EDUCATION

### RESEARCH IN HERITAGE EDUCATION

Community School Museums as a tool for education.....	537
<i>P. Alonso-Monasterio, L. Uixer Cotano</i>	
The interpretation of the vernacular in the modern work of Gherardo Bosio: the Albanian experience.....	545
<i>C. Castagnaro</i>	
“For sale: empty Spain” Raising awareness on abandoned buildings and depopulated villages .....	553
<i>V. Cristini, J. L. Baró Zarzo, C. Mileto, F. Vegas, M. Caruso, E. Tortajada Montalva</i>	
Qualitative, historical, spatial, stylistic, and social assessment of heritage buildings in Arequipa for Cultural Heritage teaching in Schools of Architecture .....	559
<i>T. B. Medina-Sánchez, D. L. Mayta-Ponce, D. Málaga-Montoya, S. Coll-Pla, F. A. Cuzziramos-Gutiérrez, A. Costa Jover</i>	
Vernacular architecture and art. The representation of traditional buildings in Lorenzo Ghiberti's Gates of Paradise in the Baptistery of Florence.....	567
<i>A. Merlo, G. Lavoratti</i>	
Defensive architecture and heritage education: analysis of the National Park Service and Parks Canada actions .....	575
<i>J. A. Mira Rico</i>	

### HERITAGE EDUCATION AND SOCIAL INCLUSION

<i>Gibellina and the identity of community. Brandi, Burri and the conservation of the 'ruins'</i> .....	585
<i>C. Accetta</i>	
The perceptive experience of the heritage landscape.....	593
<i>A. Barranco Donderis</i>	
The Role of University in Local Cultural Development Through Vernacular Architectural Conservation Education: The Case of Havran, Turkey.....	599
<i>D. U. Binan, H. İ. Alatli</i>	
The role of cultural heritage in urban reuse .....	607
<i>M. Domènech Rodríguez, D. López López, C. Cornadó Bardón</i>	
Involving society in the enhancement of old city centres .....	615
<i>A. Guardiola-Villora, L. Basset-Salom</i>	
3D Heritage as a catalyst for social participation in safeguarding cities in conflict. A Case study of Damascus in Syria .....	623
<i>S. Ibrahim</i>	

Heritage education as an effective approach to enhance community engagement: a model for classifying the level of engagement .....	631
<i>T. W. Lao</i>	
Preservation and promotion of the cultural heritage through University, public administration, and community engagement.....	639
<i>M. Mattone, N. Frullo</i>	
‘Acupuncture of Awareness’: a possible path for vernacular heritage preservation.....	647
<i>L. Rossato</i>	

### **HERITAGE COMMUNITIES**

Overlooked heritage of Albania: chronicle of rescue, conservation and community involvement at Great Prespa Lake .....	657
<i>V. Cristini, B. Ludwig</i>	
The appropriation of traditional houses in Imbros/Gökçeada .....	663
<i>A. Dinççağ Kahveci</i>	
The SDGs as a useful tool in vernacular architecture management: The case of “17 objectives and a map” .....	671
<i>A. López Sabater, V. García López de Andújar, X. Laumain</i>	
An Odyssey to Heritage Education: The Inspiring Example of Bergama and Its Communities .....	679
<i>D. Ulusoy Binan, G. G. Okyay</i>	
The role of heritage communities in local development processes through the reuse of architectural heritage. Some examples in Italian rural areas .....	687
<i>C. Valiante, A. M. Oteri</i>	

### **CREATIVITY AND HERITAGE EDUCATION**

Strategies for the recognition and the enhancement of the cultural heritage in Sant'Antioco .....	697
<i>M. Achenza, I. Blečić, L. Dipasquale, S. Mecca, A. Merlo</i>	
A collaborative Web App to foster a knowledge network on vernacular heritage, craftspeople, and sustainability .....	703
<i>J. Ammendola, L. Dipasquale, E. P. Ferrari, S. Mecca, L. Montoni, M. Zambelli</i>	
Cultural heritage: educating the next generation. Case study analysis of the Center of Preservation Research .....	711
<i>E. Vlahos</i>	

### **ARTISANS AND CRAFTS OF TRADITIONAL CONSTRUCTION**

#### **INTANGIBLE HERITAGE: THE MANAGEMENT OF KNOW-HOW AND LOCAL CONSTRUCTION CULTURE**

The towns of the Popocateptl Volcano. Territorial symbolism, cultural identity and vernacular architecture .....	721
<i>B. Aguilar Prieto</i>	

Methodology for mapping Intangible Cultural Heritage through webGIS integral platforms. La Fontanalla neighbourhood as a case study .....	729
<i>F. Conejo-Arrabal, F. J. Chamizo-Nieto, N. Nebot-Gómez de Salazar, C. Rosa-Jiménez</i>	
The struggle for Stone-dry walling: the ambition to protect both processes and products.....	737
<i>M. M. Grisoni</i>	
From intangible to tangible. Artisan Skills and Traditional Crafts for Preserving Venice's Built Heritage .....	745
<i>A. Squassina</i>	
<b>TRADITION AND INNOVATION IN TRADITIONAL CONSTRUCTION CRAFTS</b>	
The Craft of Stucco Mihrab carving in Oman in the 13th to 17th AD.....	755
<i>N. Benkari</i>	
From prototypes to monotypes. Neo-craftsmanship in architecture and design .....	763
<i>J. Bravo Bravo</i>	
<b>PLANS AND EXPERIENCES FOR THE RECOVERY AND MAINTENANCE OF CONSTRUCTION CRAFTS</b>	
Vernacular architecture and seismic risk. The case of Mugello in Tuscany .....	773
<i>P. Bordoni</i>	
Pinnettas de pedra: a guide for the valorisation of dry-stone artifacts .....	781
<i>S. N. Cappai, A. V. Sotgiu</i>	
Vernacular architecture and traditional trades. Social innovation and cultural heritage in rural Andalusia.....	789
<i>G. Carrera Díaz, B. Del Espino Hidalgo, A. Delgado Méndez</i>	
The role of craftsmanship in the conservation of Venice. State of the art and perspective.....	797
<i>F. Trovò, E. Vettore</i>	
<b>CONSERVATION, RESTORATION AND ENHANCEMENT OF VERNACULAR ARCHITECTURE</b>	
<b>CONSERVATION AND RESTORATION PROJECTS OF VERNACULAR ARCHITECTURE</b>	
Is there a future for marginal communities? .....	807
<i>M. Bocci</i>	
Restoration of the stained glass windows of the British Cemetery of Valencia .....	815
<i>C. Burguete Gil</i>	
Studies and projects for the archaeological park of the Nuraghe s'Urachi (Sardinia, Italy). From knowledge for heritage conservation to project for the community .....	823
<i>G. M. Chiri, F. Novelli</i>	
Vernacular heritage protection by the Superintendence of the Aosta Valley .....	831
<i>C. De La Pierre, D. Martinet, B. Scala</i>	

Of earth, stone and wood: the restoration and conservation of a Buddhist temple in Ladakh, Indian Himalayas.....	839
<i>E. P. Ferrari</i>	
The <i>hórreos</i> in Riaño Mountain, León, Spain. Vernacular architecture between conservation and musealisation.....	847
<i>M. P. García Cuetos</i>	
Restoration project of vernacular architecture affected for ground subsidence: A case study in Juslibol Church (Zaragoza, Spain) .....	855
<i>A. Gracia, F. J. Torrijo, M. A. Pérez</i>	
Farmhouse interior restoration in bioconstruction .....	863
<i>V. Li-Puma Sforazzini</i>	
After the earthquake. Design processes for intervention on vernacular heritage in Central Italy.....	871
<i>G. Loffredo, F. Recla, N. Suraci, C. Tosco</i>	
Implementing the lesson of early 20th century traditional buildings for a real sustainability. The examples of Corviale (Rome) and ZEN (Palermo) districts.....	879
<i>E. M. Mazzola</i>	
From rural house to “villa of delights”: knowledge and conservation of Villa Murat in the Sorrento peninsula.....	889
<i>A. Pane, R. Catuogno, M. Parente</i>	
Vernacular earthen architecture. Construction techniques and restoration. From the international setting to some specific Italian regional cases .....	897
<i>E. Petrucci, R. Mancini, M. G. Putzu</i>	
Rigour, methodology and use, success in heritage conservation: the tower of the St. Mary Magdalene’s church.....	905
<i>P. Rodríguez Cantalapiedra</i>	
Strategies to value the dispersed heritage of rural Andalusia. Lagares, paseros and vineyards: the architecture of the raisin .....	913
<i>L. Royo Naranjo</i>	
Guidelines for the conservation of the ancient hydraulic mills of the Valle Sabbia, Brescia (Italy).....	921
<i>B. Scala, L. Aliverti</i>	
Bazaars between documentation and conservation. Case studies in Albania and Macedonia.....	929
<i>A. Trematerra, E. Mirra</i>	
Perspectives for the small historical centres at risk of abandonment. A pilot project for the Granfonte district in Leonforte (Italy).....	937
<i>M. R. Vitale, C. Circo, D. Sanzaro, S. Sebastián Franco, I. Cacciatore, M. Massimino</i>	
Repair grants for historic farm buildings in Dartmoor National Park.....	945
<i>N. White</i>	

**MATERIALS AND INTERVENTION TECHNIQUES FOR VERNACULAR ARCHITECTURE**

Syrian earthen villages: recovery of construction crafts to revive dome houses.....	955
<i>H. Asslan</i>	
Historic tuff masonry in Naples: different approaches to its conservation .....	963
<i>B. Balbi, R. Bosso, G. Russo Krauss</i>	
Vernacular architecture on archaeological remains. Conservation and enhancement of the “Villa San Limato” in Cellole .....	971
<i>L. Cappelli</i>	
Conservation and restoration of timber architecture in the Czech Republic.....	979
<i>M. Cernansky</i>	
Effects of the use of plant mucilage on the physico-mechanical properties of raw earth structures .....	987
<i>O. M. Medina Lorente, B. Carrascosa Moliner, L. Osete Cortina</i>	
Vernacular architecture and archaeological remains. Direct links in the Phlegraean Fields in Campania (Italy).....	995
<i>R. Picone</i>	

**DIFFICULTIES AND POSSIBILITIES OF USING TRADITIONAL CRAFTS IN CONSERVATION**

Impediments to Sustenance and Revival of Vernacular Architecture in Rural Madhya Pradesh, India.....	1005
<i>A. Tamhankar, V. Gupta</i>	

**MANAGEMENT AND MAINTENANCE OF VERNACULAR ARCHITECTURE**

Ghadames, Libya. A traditional earthen settlement, resilient to crises and environmental challenges.....	1015
<i>S. Abdulac</i>	
Architectural Heritage and seismic vulnerability: mapping the available knowledge to reduce damage during an emergency .....	1023
<i>E. Brusa, C. Chesi, S. Della Torre</i>	
Analysis and regeneration strategies for the abandoned villages of the Santerno valley in Tuscany .....	1031
<i>M. Coppola, L. Dipasquale, L. Mannucci, L. Rovero</i>	
Learning from the past. The loss of vernacular heritage in the interest of hydropower development in Spain.....	1039
<i>N. Fernández García</i>	
Post seismic intervention strategies over the last fifty years in Italy (1968 – 2016). Initial observations about the vernacular architecture’s conservation .....	1047
<i>V. Macca</i>	

Close to the volcan. Knowledge, conservation and enhancement of a Vesuvian vernacular heritage.....	1055
<i>B. G. Marino, A. Ragosta</i>	
Heritage and community centre in Matta Sur, Chile.....	1063
<i>A. Rivera Vidal, C. Gómez Maestro</i>	
Local materials and traditions in the conservation of vernacular buildings.....	1071
<i>C. Rodrigues</i>	
Vernacular earthen architectures. Institutionalisation and management models for its conservation in northern Argentina.....	1077
<i>J. Tomasi, J. Barada</i>	
Protection and reuse of a forgotten heritage: the Parmesan cheese buildings. Notes for a widespread museum in the lower Reggio Emilia plain .....	1085
<i>S. Varvaro</i>	

## AUTHORS INDEX

## A collaborative Web App to foster a knowledge network on vernacular heritage, craftspeople, and sustainability

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**Topic:** T2.4. Creativity and heritage education

### Abstract

*Vernacular architecture provides extraordinary technological and typological solutions, which are the result of a complex system of knowledge that has evolved through trial and error, in a deep connection to the environmental, social, economic and cultural contexts. The goal of the study presented here is to propose a tool able to organise vernacular knowledge, both tangible and intangible, by systematising principles, strategies, design models and solutions in order to be more easily shared, transmitted and employed in the design of new sustainable architecture. The tool, which is developed as part of the project "VerSus+ / Heritage for People" (Creative Europe Program), is a collaborative Web Application able to map solutions and models from vernacular architecture, and to associate and classify them with sustainable strategies. In addition to physical objects (cultural landscapes, urban, typological and technological solutions), the App will also map the people involved in the knowledge management of vernacular architecture: craftspeople and professionals in the field of vernacular architecture enhancement and conservation. This tool can catalogue solutions and knowledge from different branches of vernacular architecture, and make it available to a large audience, such as professionals, researchers, artisans and citizens, who can also directly contribute to the growth of the vernacular database by adding new information and solutions to the App. The idea is to have a user friendly and easy to consult App, able to suggest new solutions to contemporary design problems, based on the observation of similar past problems, so that sustainable models developed in the past can be adapted to design and construct a more appropriate architecture for the future.*

**Keywords:** cultural heritage; sustainable and vernacular architecture; knowledge management; web mapping and mobile applications.

## 1. Introduction

### 1.1. Framework

The scope of this work is to present the design and the development of a collaborative tool that enable users to organise vernacular architecture knowledge, both tangible and intangible, according principles, strategies, design models and

solutions, in order to be more easily transmitted, enhanced, and used in the design of new sustainable architecture. This work is part of the project "VerSus+ / Heritage for People" founded by Creative Europe Program during the period 2019-2023. At the core of VerSus+ project there is to foster the conservation of cultural heritage, encouraging a more sustainable approach to

contemporary architecture, by learning from a contemporary interpretation of locally developed-cum-traditional adaptive strategies. The VerSus+ project builds on the outcomes of the earlier project: “VerSus-Lessons from Vernacular Heritage in Sustainable Architecture” funded by the EU’s Culture Programme. Starting from VerSus, several principles have been identified in order to find out strategies connected to several aspects linked to the four key levels of sustainability: natural/environmental, social, economic and cultural. Based on these assumptions, the VerSus+ People project is implemented with the aim of disseminating principles, techniques, and solutions of vernacular heritage to different audiences, and to reach a wide and varied public in order to positively impact society for a better and more sustainable development for the future (Mileto et al., 2020).

## **1.2. A tool based on people**

In order to meet the goal of reaching a wide and varied audience, dissemination includes the development of a Web Application that can help people to access and systematize cases of valuable sustainable strategies. The Web App in this sense is collective as it is not merely a virtual catalogue to be consulted, but it becomes a tool for people to contribute to organise the vast repertoire of vernacular architecture knowledge.

The Web App is also guided by other important VerSus+ aims: 1. to strengthen the role of local artisans and craftspeople, as well as companies that work on traditional construction techniques and materials; 2. to promote the study methodology, strategies, activities and principles developed, and share results not only locally or regionally, but on a national scale and possibly even internationally. For this reason, the Web App not only includes material culture examples (e.g. buildings, landscapes, cities, etc.), but also, where possible, links to people and institutions working on vernacular heritage. Thus, it promotes the creation of a network of people that constitute, with their work, an important part of what is intangible heritage and knowledge.

Intangible cultural heritage represented by people is an essential feature of VerSus+ project, as it can be considered the larger framework within which tangible heritage takes on shape and meaning (Bouchenaki, 2003). The inclusion of people, institutions and associations as integral parts of the tool allow them to be key agents in the processes for the revitalization and innovation of local architecture (Mileto et al., 2020). Cultural heritage, as a form of social construction, is related to local knowledge narratives that are co-constructed by the concurrent participation of both narrative agents and active receivers; the latter are also involved in the knowledge making process (Ginzarly & Teller, 2021). Through a digital platform, the co-constructed and participatory nature of the tool can also enable a larger participation which goes beyond localities to become more widespread in space and time.

The dissemination tool is therefore based on including people in two ways: the first is to engage with them so that they can contribute to the Web App contents (inclusive/collaborative approach), the second is to link references to people (professionals, craftspeople, communities of practice, universities etc.) for whatever material heritage examples that have been mapped.

## **1.3. Why a Web App?**

The development of an online digital platform is a powerful mean for dissemination as it provides a ‘space’ not only for documenting, but also for creating networks of people. Moreover, as compared to non-digital means of dissemination such as print books, a Web App can be constantly updated and integrated with more examples, materials, and links. This emphasis on new technologies is important to also establish a connection with other digital platforms that can be associated with the tool, for example: social networks, specialised craftspeople websites, websites for video sharing, and so on. It is also important to remember that among digital platforms, the use of social media for crowdsourcing grassroots initiatives aimed at the co-production of knowledge on heritage is still limited and not yet very explored

Name	Source	Theme and objective	InfoVis methods
mapadatterra	<a href="http://www.mapadatterra.org">www.mapadatterra.org</a>	Collaborative map about earthen architecture.	Map
Lehmbau im Wienviertel	<a href="http://thinkspecial.boku.ac.at/app/?init=1&amp;auth=ASZ5HRMPYNKGTG8N1YLSW">http://thinkspecial.boku.ac.at/app/?init=1&amp;auth=ASZ5HRMPYNKGTG8N1YLSW</a>	Web App to survey and analyse clay buildings in the Weinviertel (Austria). Through digital tools, the project aims to reach a wider audience and spread the knowledge of the local architectural heritage.	Map + mosaic
Red de Maestros	<a href="http://www.redmaestros.com">www.redmaestros.com</a>	National directory of good practices in the fields of traditional construction and its restoration.	Grid
Europeana	<a href="http://www.europeana.eu/en">www.europeana.eu/en</a>	Europeana is the EU digital platform for cultural heritage. It works with thousands of European archives, libraries and museums to share cultural heritage for enjoyment, education and research.	Grid
Atlante Architettura Contemporanea	<a href="http://www.atlantearchitettura.beniculturali.it">www.atlantearchitettura.beniculturali.it</a>	The atlas is a project endorsed by the Directorate-General for Contemporary Creativity of the Ministry of Culture that proposes to prompt a more effective “network” perception of modern and contemporary Italian architectural heritage combining several architectures in thematic itineraries.	Map + grid
Cultural Gems	<a href="https://culturalgems.jrc.ec.europa.eu/">https://culturalgems.jrc.ec.europa.eu/</a>	Cultural gems, founded by JRC, is a free open source and collaborative app to map the cultural and creative places of European cities. It is a guide for tourists but also residents, city administrators, and cultural third sector representatives.	Map + grid
Cultural Heritage Interactive Map	<a href="http://arcg.is/0TjSai">http://arcg.is/0TjSai</a>	The project invites the general public, as well as cultural heritage experts, to browse cultural initiatives and events across Europe using interactive story maps online. More than just an information source, the web tool serves as an outreach effort to increase the public’s involvement in their own cultural heritage.	Map + list
Inventing Abstraction 1910-1925	<a href="https://www.moma.org/interactives/exhibitions/2012/inventingabstraction/?page=home">https://www.moma.org/interactives/exhibitions/2012/inventingabstraction/?page=home</a>	The digital diagrams allows users to explore the relationships among the abstract artists represented in <i>Inventing Abstraction</i> (an exposition presented by MoMa in 2012-2013) all of whom played a significant role in the development of a new modern language for the arts.	Network

Table 1. Benchmarking on Web Apps and Platforms

(Ginzarly & Teller, 2021). Thus, linking the Web App to other digital ‘spaces’, which are constantly updated and which foster more public participation, is a way to expand the limits of the tool itself.

## 2. Methodology: approach and design

### 2.1. Benchmarking on Web Apps and Platforms on Traditional knowledge

Since cultures are constantly changing, the ways in which cultural heritage aspects are transmitted should also follow these dynamics. The phenomenon of digitization has made sharing easier and extended the meaning of representation and dissemination of cultural contents, making them available to a potentially much wider audience (Windhager et al., 2019).

Already in recent decades, there is a growing interest in the dissemination of cultural heritage through digital systems and there are now many platforms which work as public repositories of digital artefacts from museums, archives and libraries, such as

the well-known experience of Europeana or the Digital Public Library of America. Windhager et al. (2019) collected and assessed some recent developments of interfaces and different methods of Information Visualization (infoVis) to enhance access to cultural collections.

For the development of the VerSus plus App we analyzed other similar examples as reference. The benchmarking has been mainly focused on platforms and Web Apps that use maps as visual encoding techniques for the collection of cultural data.

A key reference is *Lehmbau im Wienviertel* platform, which was developed by the project *Think Spacial!* for the knowledge and enhancement of earthen architecture in the Region of Weinviertel, Austria (Schauppenlehner et al., 2020). An essential aspect of the project is the interaction with Citizen Science through the involvement of locals in the mapping of heritage as well as the organization and dissemination of different kinds of materials that can be downloaded.

Another valuable map-based project aimed at the dissemination of information on more sustainable ways to build is *mapadaterra*, which presents a collaborative cartography of building experiences with natural materials. One of the aims of the project is the development of a network of people interested in sustainability and natural construction that can communicate inspired by the platform's contents.

One more significant reference is the website *Red Nacional de Maestros de la Construcción Tradicional*, which is a Spanish network of artisans and masters in local know-how and a directory of good practises in the fields of traditional construction and restoration (Garcia, 2019). Its importance is the emphasis on people, therefore on their knowledge (immaterial heritage) and the involvement of craftspeople and experts in the field of vernacular heritage.

VerSus plus App, like all these projects, tries to make the best of all opportunities offered by digital technologies for documentation and dissemination of traditional knowledge. The community engagement component in this project is fundamental for two main reasons: the first one is that it helps to increase the social dimension and the feeling of being part of a group, even if virtual, and therefore contributes to the development of an awareness towards vernacular heritage; the second one is that through the production and sharing of contents, new meanings of cultural heritage can emerge (Calcagni et al., 2019).

## **2.2. A Case-Based Reasoning approach**

The design of the Web App starts from the need to create something more than an archive, a catalogue or a map of case studies of buildings, vernacular techniques or craftspeople. VerSus plus Web App wants to be a tool to provide scholars and designers with models, examples, information to create innovative solutions, for a sustainable architecture for the future. By adopting a Case-Based Reasoning approach, the information of the app wants to provide concrete examples of past solutions, in order to use them to solve a particular issue or to better understand it

today. Both Christopher K. Riesbeck, computer scientist, and Roger Schank, cognitive psychologist, are experts in artificial intelligence and focus their studies on "dynamic memory". This concept underpins the theory of CBR. At the core of this theory there is the fact that whatever experience from the past is available to us, it is likely that people will employ it as a model for future decision making (Kolodner, 1993; Riesbeck et al., 1989).

The CBR approach applied to design is based on the idea that a licit architectural solution can be drawn from similar cases from past experiences. Past scenarios can be re-used, recombined and partly revised, to satisfactorily solve a new design problem that starts from similar needs.

In order to employ suitable cases from the past to solve new problems, it is necessary to classify them in a clear and accessible way. Only by making its accessibility easier to a wider and newer audience, will guarantee that past experience will be employed (Oxman, 2003).

Indexing keys can be multiple and dynamic, as each case contains many related pieces of information. In the case of the VerSus plus App, the main reading key that we have identified for the research and resolution of design problems refers to the VerSus methodology (Correia et al., 2014). That is, the sustainability lessons learned from vernacular architecture have been chosen as attributes for indexing, archiving and researching cases and people related to both vernacular and contemporary architecture.

Furthermore, the cases were indexed taking into consideration their geographical position (they can be viewed on a map); the category (Landscape; City / town: Building; Building elements; Craftspeople; Center of documentation or dissemination); the main material or materials from which they were made of; and the type of intervention (traditional / vernacular, new, rehabilitation).



**ENVIRONMENTAL SUSTAINABILITY**

- 1 RESPECTING NATURE AND LANDSCAPE**
  - 1.1 Integrating with the land morphology
  - 1.2 Minimizing intervention
  - 1.3 Ensuring site regeneration
  - 1.4 Respecting biodiversity
- 2 TAKING BENEFIT FROM NATURAL AND CLIMATIC RESOURCES**
  - 2.1 Applying appropriate form and orientation
  - 2.3 Managing water resources
  - 2.4 Integrating soil inertia
  - 2.5 Integrating solar energy
  - 2.6 Adapting to dominant winds Integrating vegetation
- 3 REDUCING POLLUTION**
  - 3.1 Using local materials
  - 3.2 Recycling and reusing materials
  - 3.3 Using low processed materials
  - 3.4 Reducing transportation
- 4 ENSURING HUMAN WELL-BEING AND COMFORT**
  - 4.1 Using materials with high thermal inertia
  - 4.2 Using hygroscopic and transpiring materials
  - 4.3 Promoting natural lighting and ventilation
  - 4.4 Integrating adequate shading systems
  - 4.5 Integrating courtyard or buffer-spaces
  - 4.6 Using non-toxic materials
- 5 REDUCING DISASTER RISKS**
  - 5.1 Choosing appropriate sites
  - 5.2 Designing robust and flexible structures
  - 5.3 Employing compact and aerodynamic shapes
  - 5.4 Employing seismic resistant elements
  - 5.5 Promoting building adaptation to disasters
  - 5.6 Integrating damage mitigation systems

**SOCIO-CULTURAL SUSTAINABILITY**

- 6 PRESERVING THE CULTURAL LANDSCAPE**
  - 6.1 Respecting values and dynamics of the landscape
  - 6.2 Supporting bio-diversity
  - 6.3 Implementing water collection systems
  - 6.4 Implementing erosion protection systems
  - 6.5 Enhancing local crops
- 7 TRANSMITTING AND SHARING BUILDING CULTURES**
  - 7.1 Fostering constructive experiences and practices
  - 7.2 Fostering the application of empirical know-how
  - 7.3 Recognizing the value of masters and craftspeople
  - 7.4 Involving young people in construction processes
  - 7.5 Facilitating local community participation
  - 7.6 Promoting self-maintenance processes
- 8 ENCOURAGING CREATIVITY**
  - 8.1 Promoting collective intelligence
  - 8.2 Encouraging diversity
  - 8.3 Integrating other building-cultures' influences
  - 8.4 Allowing experimentation of different building techniques
  - 8.5 Fostering evolution through experimentation, trial and error processes
- 9 RECOGNIZING INTANGIBLE VALUES**
  - 9.1 Expressing collective memory
  - 9.2 Representing cultural identity
  - 9.3 Enhancing a sense of place
  - 9.4 Recognizing the value of history and mythology
  - 9.5 Expressing peace and well-being
- 10 ENCOURAGING SOCIAL COHESION**
  - 10.1 Fostering pedestrian areas
  - 10.2 Fostering a shared management approach
  - 10.3 Enhancing public spaces
  - 10.4 Sharing services and infrastructures
  - 10.5 Implementing collective spaces for recreational activities

**SOCIO-ECONOMIC SUSTAINABILITY**

- 11 SUPPORTING AUTONOMY**
  - 11.1 Integrating residential and production spaces
  - 11.2 Implementing autonomy in food production
  - 11.3 Implementing autonomy in water supply
  - 11.4 Implementing local systems for goods transformation and conservation
- 12 PROMOTING LOCAL ACTIVITIES**
  - 12.1 Fostering local production
  - 12.2 Fostering a short supply chain
  - 12.3 Fostering local labour
  - 12.4 Fostering local economy
  - 12.5 Fostering the use of local materials
- 13 OPTIMIZING CONSTRUCTION EFFORTS**
  - 13.1 Adopting appropriate size
  - 13.2 Promoting low-tech techniques
  - 13.3 Reducing transportation of goods
  - 13.4 Sharing common spaces
- 14 EXTENDING LIFETIME**
  - 14.1 Replacing building components when needed
  - 14.2 Implementing effective protection systems against weathering
  - 14.3 Implementing effective maintenance plans
  - 14.4 Fostering flexible systems
  - 14.5 Implementing long-lasting structures
- 15 SAVING RESOURCES**
  - 15.1 Sharing infrastructure and services
  - 15.2 Promoting urban density and building compactness
  - 15.3 Integrating renewable energy sources
  - 15.4 Reducing embodied energy
  - 15.5 Minimizing heat losses
  - 15.6 Integrating passive systems

Table 2. The sustainability principles and related strategies

**2.2. VerSus principles and strategies for indexing, archiving and researching cases**

VerSus methodology approaches the concept of sustainability from a transversal, holistic and multidisciplinary perspective. The methodology is based on three main levels of reading: 1. Three sustainable scopes: environmental, socio-cultural and socio-economic; 2. Five principles/aims or key questions related to each sustainable scope; 3. For each principle a list of strategies learnt from vernacular heritage for the design of a more sustainable architecture.

The definition of the 15 principles and related strategies is the result of a deep research work that started from the observation of vernacular architectures, which unlike standardised solutions of modern architecture, have adapted over time to local resources, to the limits and the risks defined by the natural as well as the socio-economic context.

Principles and strategies related to the environmental dimension of sustainability refer to the capacity to integrate a settlement, a building, and their related crafts with the environmental characteristics of a place, benefitting both from

natural and climatic resources, and by limiting pollution and waste. Principles and strategies related to socio-cultural sustainability refer to the capacity to guarantee and strengthen the sense of belonging, cultural diversity, local knowledge and know-how, personal and community well-being, social cohesion, the recognition of tangible and intangible cultural values. Socio-economic sustainability principles and strategies refer to the capacity to produce and maintain income and social well-being within the territory, supporting autonomy, promoting local activities, and saving resources.

Indexing through the VerSus strategies and principles listed in Table 1.2 is aimed at archiving vernacular knowledge to be used in the context of problem-solving, where 360-degree sustainability is a priority for the definition of new design ideas. The list of strategies is not fixed but it can be expanded and adapted according to the choices and the entries of the users who will use the App.

### **3. Implementation: a collaborative and cognitive Web App**

#### **3.1. Designing VerSus plus App: concept**

The VerSus plus App is a multifarious disseminating tool that brings together different aspects: documenting and mapping tangible and intangible elements coming from vernacular heritage; looking for references of architectures, landscapes, understanding people knowledge where sustainable strategies are applied; understanding the sustainability degree of a case; and creating a network where all users can contribute to the construction of this database.

The Web App came out firstly as a tool for mobile devices, emphasizing the immediacy of the use and the accessibility to anyone from everywhere. It can be used as a map where the icons suggest the category of the entries, or by browsing the list of all of them (Fig 1). In this way, it is possible to customise the experience using filters, so that the users can visualise the features they need. Users can select according to their personal interests choosing between different

categories (from cultural landscape to human scale), materials, types of intervention, sustainability principle and strategies.

By logging in the app, people can insert new entries contributing to the growth of the available database. As shown in the last image of the Fig 1, the sheet of the entries contains some generic information (category, address/place, materials, period), a brief description, a gallery with images and videos, and some references that user could simply fill in together with the attribution of tags that correspond to sustainability strategies and principles of the feature.

A basic profile of the users could be a way to connect people that are members of this network. The possibility of sharing references, links, contacts goes with the idea of creating synergies and connections with similar realities. For a better understanding of the sustainability principles or a deeper investigation on the thematic field, visitors or members can find supportive materials.

The first mapping campaign of the various features has been done for the two case studies of Sant'Antioco (Italy) and Formentera (Spain) and then opened to the other inter-project experiences. The cases already documented in the previous projects (VerSus, 3d Past) are loaded. The app will be subsequently implemented by students and researchers involved in the activities that apply the VerSus methodology (Muñoz et al., 2022) and by all people that become aware of it and recognize its values. Existing networks among scholars and professionals in the fields of sustainability and vernacular knowledge will be the main channels to disseminate the VerSus plus App.

#### **3.2. UI/UX design tools applied to the project**

The design and development of User eXperience (UX) / User Interface (UI) design of the Web App has been preceded by extensive research and followed three main principles: User-Centered Design (UCD); mobile first approach; “map-first” approach in data presentation. The three principles can be considered, for this project, strongly correlated.

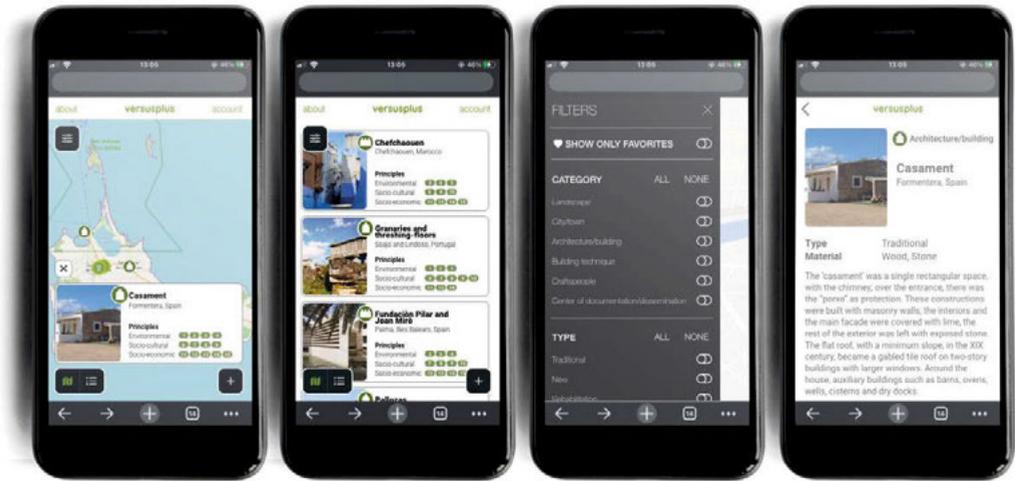


Fig. 1. Versus+ Web App interface

Mobile web cartography is a relatively recent field that in the last years has seen a significant development. Nevertheless, most of real applications are still in the commercial sector, and research-based projects are still rare or in development (Wang et al., 2017). The present case can be included according to Tsou (2013) classification in the fifth generation of apps, primarily regarding crowdsourcing of data. Mobile-first approach was applied to the design of visual elements and interactions. High value has been given to consistency between mobile and desktop versions, as well as between map-based and list-based presentation of the dataset. The preeminence of the former over the latter, as the main user interaction model, has guided the whole process of design.

The UCD, a widespread design model, was interpreted in this particular case mostly as an attentive research about current patterns and practices in largely used design of mobile and desktop geographical applications, primarily navigation apps such as Google Maps or Apple Maps (Ricker & Roth, 2018). A more specific analysis came from the research of real estate websites, whose dataset share many common aspects with the current use case. The reproduction of patterns of behaviour found in existing and widely used digital tools has the specific

aim of improving the ability to interact with the interface for first time users. The UX design of the application is oriented in enable users to interact in easiest way with a complex geolocalized database, organized in a highly articulated classification system. The navigation and UI is studied to be accessible in desktop and mobile environments to all kind of users, granting different levels of detail to both occasional and recurring visitors. Layouts and icons were chosen among a series of options following usability tests on a sample of potential users.

#### 4. Conclusions: expected positive outcomes

The value of traditional and local knowledge in providing models capable of generating solutions that strengthen the identity of the community are sustainable over time from a social, environmental, economic, and undoubtedly cultural point of view is widely recognized.

VerSus plus Web App allows to connect architectural examples and related practical knowledge in a semantic network, where conceptual links are created by the principles of sustainability, through which we intend to interrogate and navigate the remarkable heritage of vernacular knowledge.

The use of the tool over time will give us feedback on the usability of the Web App, so that we can work on its strengths and weaknesses. Moreover, periodic considerations on the system provide an analysis of the citizens' approach/trends and interests in the vernacular heritage and could provide an outlook on where we are standing in terms of learning from sustainability strategies. This is also useful to bridge the gap between experts and users in order to allow decision making processes about urban heritage capable of engaging both experts and civil society (Ginzarly & Teller, 2021; European Commission, 2017).

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