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LETIZIA DIPASQUALE

SAVERIO MECCA

LUCIA MONTONI

Heritage for people

Sharing vernacular knowledge to build the future

This collective work gathers five European university institutions and integrates contributions from the project leader and the project partners. In addition to the Editors, the main contributors are:

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FOREWORD

Hubert Guillaud
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This book is the sixth publication derived from the European project *VerSus / Lessons from Vernacular Heritage to Sustainable Architecture*, which was launched in 2014. Resulting from the collaboration between five teams of researchers and lecturers from architecture schools in four countries, this book develops the issue of educational tools to disseminate what the first two books had presented, namely the sustainable qualities of vernacular habitats. In the initial project phase, the analysis identified a set of fifteen social, economic, cultural and environmental qualitative principles. By following this qualitative approach, the *VerSus* analytical grid complemented the limitations of a quantitative approach, which is technocratic and technical in nature, as well as based on calculation methods that cannot cover the lessons learned from vernacular habitats. However, in this qualitative approach it is important to keep the right distance and not to idealise buildings which also have their faults and shortcomings. However, beyond the local materials of vernacular architecture (mainly stone, earth, wood and other plant-based materials), beyond the genius of the local builders, it is important to note the essential contribution of vernacular buildings to the construction of landscapes, to their identities, and to their beauty.

The *VerSus* method of analysis escapes a purely theoretical approach and feeds a critical eye that can only be useful to those who appropriate this assessment tool. And there have been more and more of these, in an increasingly vast geography of countries and training institutions. They appreciate the clear understanding they can have of habitats and their obvious place in the landscape. They also appreciate the relevance of these analyses for the design of contemporary projects. The recent catalogues of projects from the two international Terra (2016) and Fibra (2019) awards confirm this trend towards the recreation of a contemporary vernacular architecture that once again makes sense in the current production that is unfortunately too often stripped of cultural intelligence.

VerSus+ goes further in its proposals to preserve and safeguard the heritage of habitats, to draw inspiration from them in the production of human settlements on a people-friendly scale, while the trend towards the urbanisation of territories is asserting itself. Marcel Mauss' "gift upon gift" spirit is back on the agenda (Mauss, 1925). What this heritage gives us calls in return for our own gift of intelligence and meaning to appease our projections. May this book inspire new attitudes and creative imaginations in order to contribute to a true systemic revolution in the production of our habitats, since we have arrived "at the wall". It is not a question of going backwards, but of recreating with the best of the past in order to set out a new path that can "liberate our future" (Illich, 1971).

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opposite page
Vernacular architecture, Cameroon
(credits: S. Moriset)

FOREWORD

Marwa Dabaieh

ICOMOS CIAV vice president & ISCEAH board expert member

In a world that constantly seeks innovative solutions to pressing challenges, this book stands as a beacon of wisdom, illuminating a path that draws upon the wealth of vernacular knowledge to shape a sustainable and harmonious future. Within the pages of this seminal work, readers will embark on a transformative journey, guided by a consortium of experts whose collective wisdom transcends disciplinary boundaries.

The chapters in this book are meticulously crafted and organised to explore the multifaceted dimensions of vernacular wisdom in contemporary contexts. *Lessons from Vernacular Architecture to Sustainability* opens the discourse, delving into the age-old wisdom encapsulated in vernacular architecture and its profound lessons for sustainability. As our world grapples with the pressing issues of environmental degradation and the scarcity of resources, this theme underscores the pivotal role that vernacular architecture can play in redefining our approach to design, construction, and resource management. The subsequent thematic section, *Strategies for the Management and Dissemination of Traditional Knowledge for a Sustainable Future*, delves deeper into the practical applications of vernacular wisdom. Its sub-themes — *Conservation and Design, Education Strategies, Community Engagement, and Vernacular Knowledge Management and Dissemination* — encompass the comprehensive spectrum of strategies necessary to harness and proliferate this invaluable heritage. These pages serve as a roadmap, charting a course for the preservation and revitalisation of traditional knowledge within our globalised world.

At the heart of this volume lies the conviction that heritage belongs to people. It is a treasure trove that transcends geographical borders and embraces cultural diversity. 'Heritage for People' champions the ethos that vernacular knowledge is not an artefact of the past but rather a living repository of solutions for the future. As such, it extends an open invitation to all readers, regardless of their background, to engage with and contribute to this ongoing dialogue.

The authors, who come from a wide array of fields and backgrounds, apply their unique experiences, enhanced by hands-on practice and cutting-edge research. They have navigated the intricate interplay between tradition and innovation, demonstrating that our heritage is not static but an ever-evolving source of inspiration. Their contributions reflect an unwavering dedication to forging a sustainable future that respects both the wisdom of the past and the aspirations of the present.

In closing, *Heritage for People: Sharing Vernacular Knowledge to Build the Future* emerges as a scholarly tour de force, an invaluable resource for academics, practitioners, policymakers, and anyone seeking to navigate the complex terrain of heritage and sustainability. As we embark on this intellectual journey, let us heed the call to embrace the collective wisdom within these pages, for in doing so, we empower ourselves to craft a future where heritage truly becomes the foundation upon which we build a more sustainable, inclusive, and enlightened world.

opposite page
European Heritage Volunteers Project *Conservation of historic dry stone walls* at Belvedere Park, part of the World Heritage site 'Classical Weimar', Germany
(credits: European Heritage Volunteers)

HERITAGE FOR PEOPLE. A PROJECT FOR CONNECTING PEOPLE WITH THEIR TANGIBLE AND INTANGIBLE HERITAGE

Camilla Mileto, Fernando Vegas
Universitat Politècnica de València, Valencia, Spain

With the participation of: V. Cristini, L. García-Soriano, L. Dipasquale, A. Merlo, M. Achenza, A. Rivera, B. Rakotomamonjy, S. Moriset, N. Sánchez, M. Correia, G. Carlos

Introduction

Vernacular architecture is a tangible and intangible heritage of great importance to both 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, thus developing cultural, social and constructive traditions based on the conditions of the surrounding nature and habitat. According to the ICOMOS *Charter on the built vernacular heritage*: "Vernacular building is the traditional and natural way by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation, as a response to social and environmental constraints. […] The built vernacular heritage is important; it is the fundamental expression of the culture of a community, of its relationship with its territory and, at the same time, the expression of the world's cultural diversity" (ICOMOS, 1999). Vernacular heritage is composed of traditional buildings, which represent a morphological response to the constraints of the environment and climate. Additionally, the materials and architectural components used are climate responsive, tailored to distinct locations, adapted to seismic, geographical and climatic features, as well as to social behaviour and cultural traditions. It is also a cost-effective architecture with low environmental impact. All the know-how, the intangible heritage of knowledge and skills that vernacular heritage encompasses, has to be made clear for fostering education and creative training as new forms of vernacular heritage protection, based on the knowledge and awareness of heritage in its dynamic dimension.

In addition to comprehensively including all these values which we now recognise, traditional architecture plays an essential role in contemporary society, since 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 project *VerSus: Lessons from Vernacular Heritage in Sustainable Architecture* (grant 2012-2792/001-001 CU7 COOP7) co-funded by the European Union between 2012 and 2014 (Correia et al., 2014; Guillaud, Moriset, 2014). The *VerSus* project, with an approach which is currently relevant to the scientific and technical communities as well as the general public, had widespread impact (with over 10,000 downloads of the documents from the webpage) and international recognition (it received the European Award for Architectural Heritage Intervention 2017 in the Dissemination Category). It was also recognised by the European Union, which selected it as a "success story" due to its impact, its contribution to the drafting of policies, and its innovative results and creative approach which can serve as an inspiration for other projects. Although this

project had considerable repercussions for the European and international communities, the knowledge and awareness it provided need to reach the very heart of society in order to spread this awareness to all its sectors. This is the basis for the conservation of tangible and intangible heritage, as well as for a more sustainable architecture for the future. For this reason, the *VerSus+ / Heritage for People* project was proposed. This project has focused on the transmission of knowledge to all branches of society and the general public. It has paid special attention to the society of the future (children and young people), as well as to local, regional and national authorities in charge of heritage management, including specialists and experts in the field of architecture (architects, engineers, cultural managers, historians, ethnographers, university students, etc.), together with craftspeople and companies in the construction and tourism sectors, cultural and social associations and educational institutions. The Project *VerSus+ / Heritage for People* (grant: 607593-CREA-1-2019-1-ES-CULT-COOP1) has been co-funded by the European Union between 2019 and 2023.

Aims of the project

The project *VerSus+ / Heritage for People* aimed to enhance new perspectives and opportunities starting from best practices, and to promote the development of local skills toward the "living heritage community" mentioned by the Faro Convention (2005), the Charter of Venice (1964) and UNESCO Conventions for the Safeguarding of the Intangible Cultural Heritage (2003), as well as in the Protection and Promotion of the Diversity of Cultural Expressions (2005). The project intended to reach out to society, showing the sustainable qualities of the identified examples, through the establishment of an operative approach that can be adjusted to different contexts, and which can be adopted by local communities. The lessons derived from vernacular heritage can be applied in the conservation and rehabilitation, as well as in the conceptual design of the sustainable contemporary architecture that will become the heritage of tomorrow.

The project established three general aims: to promote, strengthen and expand international and transcultural relations through dynamic, innovative and creative actions, as well as to promote international cooperation between experts and institutions from different European Countries working in the fields of sustainable and vernacular heritage; to apply knowledge from the fundamental lessons and principles of vernacular heritage in order to improve the recognition of vernacular habitats through the awareness of their values and qualities, focusing both on the heritage aspect and on what they offer in terms of sustainability and know-how for the development of the society of the future and a more sustainable architecture; to disseminate the principles, techniques, and solutions of vernacular heritage in European society, so that these can be adapted to respond to the real needs of European societies in terms of culture, identity, quality of life and environment.

Based on these three general objectives, four specific aims were established for the project: the application of a multidisciplinary study methodology to analyse the state of vernacular heritage and its

potential in a limited geographical setting, taking into account tangible and intangible aspects, cultural and social expectations, administration and management problems, the relevance of its principles and lessons in the field of architecture and in local society, and extracting conclusions and guidelines to draw up strategies for education, awareness, and for the application of the principles and lessons from vernacular heritage; the development of educational creative activities which allow the principles and lessons from vernacular heritage to be transmitted to a wide heterogeneous audience (general public, children and young people, migrants and refugees, administrators and managers, craftspeople and companies, etc.) using different strategies (active, participative, creative, etc.) and tools (traditional, digital, visual, interactive, etc.). These activities, designed specifically for the project, are a body of work that is applicable beyond the duration of the project itself and which can be extrapolated to different contexts; the strengthening of the role of local artists and craftspeople and companies by giving them control of traditional constructive materials and techniques in contemporary society and making them key agents in the processes for the revitalisation and innovation of local architecture through promotion, appreciation, and intercultural exchange; the promotion of the study methodology, action strategies, activities developed and project results at local, regional and national levels and in a European context through different media (presentations, talks, social networks, publications, etc.). These objectives have led to the establishment of four work axes.

1. *Vernacular heritage contribution to sustainable architecture*: actions aiming to create and increase knowledge of lessons from vernacular heritage and new ways of integrating these lessons into contemporary sustainable architecture.

2. *Materials and art*: actions aiming to develop awareness in the audience through communicative and expressive forms linked to the art world, such as sculpture, painting, music and the creation of art objects through the manipulation of local materials and local knowledge.

3. *Local craftspeople and traditional construction knowledge*: actions aiming to develop awareness in the audience through activities which provide an understanding of the role of craftspeople and traditional materials and techniques in local development, as well as of their current application for a more sustainable architecture and society.

4. *Innovative communication and dissemination strategies for reaching a wider audience*: activities focused on disseminating the content and results of the project, while reaching new audiences through different strategies.

Target audience

The main aim of this project has been to transmit knowledge to different audiences, reaching a wide and varied public, and potentially affecting future society and more sustainable local development. Therefore, the aim has been to reach different audiences.

- *The general public*: made up of citizens of all ages who live in the location chosen for the study and

the implementation of activities, as well as national and international tourists present there while the activities are being carried out or who can be reached with the final materials.

- *Children and young people*: the project has focused especially on this audience, part of the society of the future (children and young people), through creative and leisure education activities encouraging awareness of the potential of vernacular tangible and intangible heritage for the world of the future.

- *Migrants and refugees*: as new members of local society, their integration is fundamental for a seamless coexistence. In this sense, the project aims to include them as recipients of the constructive tradition and local know-how, and thus to bring them closer to their host country. In addition, the acquisition of practical knowledge can improve their employability.

- *Local, regional and national administrations*: these administrations are in charge of heritage management and should be involved and interested in meeting the project objectives. The participation of administrations is essential in ensuring that good use is made of the acquired knowledge and the human resources of craftspeople, artists and trained specialists.

- *Specialists and experts in the field of architecture*: these are specialists (architects, engineers, cultural managers, historians, ethnographers, anthropologists, geographers, university students, etc.) from different disciplines who currently, and in the short- and mid-term, take part in management and action in heritage, in the construction of buildings, in urban design and planning, in resource management, in strategy design, etc..

- *Craftspeople and companies from the construction and tourism sectors*: there are still craftspeople who use traditional materials and techniques, but it is essential to preserve this knowledge transmitting it to craftspeople and companies currently in operation. Also, artists should be involved in order to make the knowledge intended to be transmitted more appealing.

Methodology

The objectives set out and the chosen target groups have helped shape the methodology used in the *VerSus+ / Heritage for People* project. This methodology is based on a multidisciplinary approach (architectural, historical, geographical, territorial, administrative and managerial, technical and constructive, artistic and creative, social, educational, etc.). This made it possible to outline strategies to transfer the principles and lessons from vernacular heritage to society through the design of specific activities for citizen participation, education, promotion and dissemination, and their current implementation in collaboration with the local administrations and social agents involved.

Four main strategies were established to carry out this project, which guide all the actions developed.

1. *Research and documentation strategies*: without doubt, the first step in the transfer of knowledge is to understand what one intends to transmit. To do so, it is vital to study, research and document tangible and intangible traditional heritage, transmitting the values and aspects considered important to society.

The four strategies established in the project and types of activity proposed
(credits: authors)

2. *Community engagement strategies*: when working in the field of tangible and intangible vernacular heritage it is vital to ensure the involvement of the local population, who are the users of this heritage, as well as its recipients and guardians. The aim is therefore to establish channels of communication with the local population, the administration, specialists working in the field of heritage, as well as craftspeople, builders, etc.

3. *Education strategies*: formal or informal education plays a key role in training and raising awareness among today's young people, who are the pillars of tomorrow's society. Carrying out educational actions is therefore essential when transferring knowledge of the tangible and intangible heritage to society in the future.

4. *Dissemination strategies*: dissemination on a small, medium or large scale allows concepts, content, and activities to be observed by different sectors of both the scientific and general public. Thanks to digital networks and platforms, increasing numbers of users can currently be reached, both nationally and internationally.

Based on these four strategies, a series of actions was devised, each addressing one or more strategies, and geared towards one or more target groups: scientific, educational and training activities, fieldwork, and dissemination activities.

This in-depth transmission was to be carried out in specifically defined contexts, such as islands and archipelagos (geographically limited territories with accessible administrative, technical and social agents and collaborators), places where vernacular heritage is under pressure, subjected to the transformations of contemporary life, especially mass tourism. These pilot experiences, focused on cases in the Mediterranean area, were designed as a real testing ground for the implementation of actions for social participation, dissemination, education, communication and promotion in different contexts and

	KNOWLEDGE TRANSFER STRATEGIE				TARGET GROUP										
	1. Research and Documentation	2. Engagement	3. Education	4. Dissemination	uni. students	children	young people	authorities	professionals	researchers	craftspeople	artists	migrants	tourists	general pub.
CONFERENCE AND SEMINARS															
International Conference	•		•	•	•					•					
Conference proceedings	•			•						•					
Conference exhibitions	•			•	•					•					
Scientific Seminar	•		•	•	•					•					
Scientific workshop	•			•						•					
Seminar proceedings	•			•						•					
FESTIVALS															
Architecture documentation	•				•					•					
Craftspeople interviews	•	•								•	•				
Artists interviews	•	•								•		•			
Seminar Formentera (Talks)	•	•	•	•	•			•	•	•	•	•		•	•
Didactic Workshop Calasetta	•	•	•	•	•					•					
Didactic Workshop Formentera	•	•	•	•	•					•					
Art and craft call		•		•								•			
Art and craft exhibition		•		•	•	•	•	•	•	•	•	•	•	•	•
Art and craft award				•							•	•			
Dry Stone workshop		•	•		•				•	•	•	•	•	•	
Recycled Materials workshop		•	•		•	•	•				•	•	•	•	•
VerSus workshop	•		•		•										
TOOLS															
Web App	•	•	•	•	•			•	•	•	•	•			•
Website				•	•		•	•	•	•	•	•			•
Instagram/Facebook				•	•		•	•	•	•	•	•	•	•	•
Youtube Channel	•			•	•		•	•	•	•	•	•	•	•	•
Digital interactive games		•	•	•	•	•	•								•
7 Families game		•	•	•		•	•						•	•	•
Booklet				•	•			•	•	•					
Book	•			•	•			•		•					
Videos				•	•	•	•	•	•	•	•	•	•	•	•
Digital exhibition				•	•			•	•	•					•
TOTAL	16	12	11	22	20	5	8	10	10	22	11	12	7	8	11

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Table showing the 4 strategies, 28 actions and 11 target groups established in the project
(credits: authors)

through different media. These direct experiences in such locations were designed to later have repercussions throughout the region and subsequently throughout the whole country. In addition, the promotion and support from associate partners makes it possible for these experiences to be applied in other similar European and international contexts.

Case studies

The case studies were to be carried out in geographically defined settings, such as small inhabited islands which offer examples of important tangible and intangible vernacular heritage currently in a phase of adaptation and updating due to the demands of contemporary society, jeopardised by the pressure of tourism. All these factors contribute to the transformation and gradual disappearance of local vernacular heritage, ways of life and constructive traditions. These small islands also provided an opportunity to work in a territory where local administrations, educational institutions, associations, etc., could be easily accessed in order to study the current situation and to design action and implementation strategies for the project activities. The islands selected were used as a pilot project to carry out all the activities designed within the project, involving residents from the entire region, while also being open to the participation of an international public. The case selection focused on the Mediterranean

area, which straddles an easily accessible territory with islands rich in vernacular heritage, thus serving as an exceptional starting point for the project, which aims to expand its reach in the future.

The selection criteria for these islands was as follows: small or medium islands within EU territory, since they are easier to monitor and the population is more accessible; islands with a notable presence of traditional architecture that are inhabited year-round and are subject to pressure from tourism, which is both an opportunity and a risk factor for tangible and intangible vernacular heritage. Two small islands in the Mediterranean were selected based on these criteria: Formentera, in the archipelago of the Balearic Islands (Spain), with a surface of 83.24 km² and a resident population of 12,124 inhabitants, and Sant'Antioco, in the archipelago of Sulcis (Italy), with a surface of 87 km² and a population of 11,811 inhabitants. Both islands, with similar size and population, display very different cultural characteristics and vary widely in terms of territory, nature, architecture, production activities, etc.

Outputs

The *VerSus+ / Heritage for People* project is based on the execution of a wide range of activities aimed at different audiences according to education, interest and age. The almost thirty activities devised and carried out as part of the project address one or more of the four previously mentioned strategies (research and documentation; community engagement; education; dissemination). Throughout the project, different scientific activities, fieldwork activities and social participation activities – both local and international – were carried out, along with education and training activities, promotion activities geared towards craftspeople and artists, and dissemination activities which could be grouped into three major categories: scientific activities, festivals and tools.

Scientific activities

These are all the study, research, training and dissemination activities carried out within a scientific framework and providing scientific results. These include:

- An international conference, *HERITAGE 2022 – International Conference on Vernacular Heritage: Culture, People and Sustainability* (Valencia, Spain, September 2022), with 254 participating authors from 25 countries, the publication of proceedings with 134 peer-reviewed papers and a scientific committee made up of 102 outstanding researchers from 24 countries worldwide. As part of this conference, four exhibitions were set up to showcase projects related to the project themes.

- An international seminar, *Which future for vernacular architecture & earthen architecture?* (Porto, Portugal, June 2023) with over 60 experts from 20 countries worldwide taking part and with the publication of proceedings and 31 papers. This seminar also included a scientific workshop with over 20 international experts on the theme examined in the seminar, whose conclusions were published in a book together with the seminar proceedings. This seminar was also combined with the exhibition of work by students linked to the project, vernacular architecture and its current lessons for sustainability.

Festivals

Two festivals were held (in Sant'Antioco, Italy, in April 2022, and in Formentera, Spain, in March 2023) presenting a wide range of activities which aimed to address the four established strategies, and

geared towards a heterogeneous audience. These activities also made use of tools developed within the framework of this project. The activities were prepared and all the necessary tools designed prior to the start of these festivals.

- *Architecture documentation*: in both the locations studied (Calasetta on the island of Sant'Antioco and the island of Formentera), vernacular architecture was documented through case studies that were digitised (with a 3D laser scanner) and the analysis of constructive materials and techniques, relationship to place and territory, etc.
- *Interviews with craftspeople and artists*: both before and during the festivals, interviews were carried out with local artisans and artists working with local traditional techniques or developing the relationship between territory and sustainability from an artistic angle. These interviews were useful in providing knowledge of the local traditions.
- *Formentera Seminar (talks)*: during the festival in Formentera, ten brief talks were organised, open to the participation of island residents, in order to facilitate an exchange of opinions and a debate between local and external experts and local residents. The wide-ranging selection of themes discussed included knowledge of the heritage values of the island, educational and social participation strategies and tools, strategies for the dissemination of vernacular heritage, experimentation with traditional materials in contemporary architecture, etc.
- *Educational Workshops*: educational workshops were organised in Calasetta and Formentera with students from the schools of architecture of the Universities of Florence and Cagliari and from the

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Educational Workshops based on the *VerSus* methodology in Formentera, Spain
(credits: authors)

Universitat Politècnica de València. During these workshops, students were able to learn about tools and methodologies for documenting tangible and intangible vernacular heritage, the enhancement of vernacular heritage, the design of new uses, the design of educational tools and games, etc.

- *Call for arts and crafts and exhibition*: an international call was put out for artists and artisans to show their work in relation to the current use of tradition, with a more contemporary slant. Of the works submitted, 28 were selected for display in the arts and crafts centre of Formentera. A panel of renowned expert judges awarded prizes to the submissions best suited to the themes put forward in the call.

- *Workshops with local craftspeople and artists*: different workshops were organised with local artists and artisans to learn the local techniques (dry stone) and traditions (fishing and vine growing) and to reflect on the relationship between the place and the environment (recycled art workshop).

- *VerSus workshop*: two workshops were held with the participation of students from the different universities. The *VerSus* methodology was used for the analysis of traditional architecture and for learning the correct use of these sustainability principles both in restoration and in new construction projects.

- *Learning activities and games*: games sessions were organised with the local community using the games and tools devised for Calasetta and Formentera.

Tools
Different tools were designed and implemented to provide a response for education, social participation and dissemination strategies.

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**Participants in the *VerSus+*
Festival in Formentera, Spain**
(credits: T. D'Intino)

- *Website and social media*: in addition to detailing the objectives and methodology of the project, the website highlights its greatest achievements. These results have also been promoted on different social media platforms including Facebook and Instagram. The YouTube channel for the project has made all the videos of interviews with artists and craftspeople available, in order to document, promote and showcase their work.

- *Heritage for people Web App*: an open access collaborative digital tool has been made available to the public for free. This app allows users to input cases of tangible and intangible vernacular heritage, as well as architectural samples of new construction and cultural landscapes, all of which are analysed based on the principles of the *VerSus* project. The database is gradually completed with cases provided by users, also creating a stock of cases which can be consulted at any stage, and used as educational tools showing how the cases can be related, finding cases for the individual sustainability parameters, etc.

- *Digital interactive games*: four serious games were designed for learning more about a place, in this case Calasetta on the island of Sant'Antioco (Italy), through interaction with architecture, traditions and people. These four virtual games can only be played on site so that users must interact with tangible and intangible heritage in order to advance.

- *7 Families game*: based on the traditional happy families game, a set of seven families was designed linked to the seven LU or landscape units of the island of Formentera. For each 'family' or landscape unit, the cards illustrate the landscape, architecture, building techniques, materials and locations for extraction and production of materials. This card game, which is aimed at the general
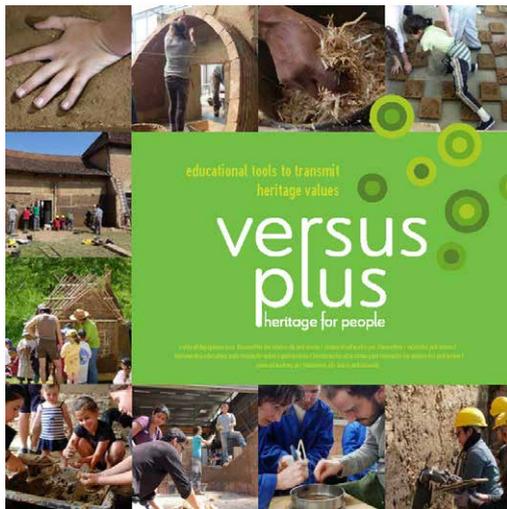
public, teaches about the relationship between the landscape, materials and architecture, as well as the island's place names.

- *Booklet*: the booklet includes twenty examples of educational or citizen participation activities which are developed for different types of public, different scales of tangible and intangible vernacular heritage, and the fifteen environmental, sociocultural and socioeconomic sustainability principles defined in the *VerSus* project. This booklet aims to encourage university, secondary and primary school teachers, as well as cultural managers, to carry out possible educational and social participation activities.

- *Book*: the book *Heritage for People. Sharing Vernacular Knowledge to Build the Future* (which you now hold in your hands) aims to analyse four possible strategies for knowledge transfer in relation to tangible and intangible vernacular heritage (conservation and design, education, community engagement, knowledge management and dissemination), also providing examples of good practices for each of these.

- *Videos*: the activities carried out in both festivals, and the interviews with craftspeople and artists were documented on video to show the wide range of activities and audiences involved in this project. A final information video on the project was also produced.

- *Digital exhibition*: this exhibition reinterprets digital art related to the tangible and intangible vernacular heritage, also reviewing values and concepts from this contemporary digital art perspective.

Finally, it is worth noting other activities developed in connection with the project, including educational workshops with students from different schools which led to reflection on the lessons in sustainability of vernacular heritage and their possible use in contemporary architecture, presentations of the project in different national and international forums, etc.

Results

From the outset, the *VerSus+ / Heritage for People* project aimed at the transfer of the principles and lessons in sustainability obtained from tangible and intangible vernacular heritage and applied both to

Homepage of the project website

modern life and to contemporary architecture. The project has focused mostly on people, both young and old, specialists, students in the field or those completely new to it, local residents, tourists, migrants, etc. Despite the pandemic which broke out in 2020, the project successfully completed most of the actions which had been devised from the start, even expanding actions and activities in some instances. Establishing guidelines (knowledge, teaching, participation and dissemination) has been essential to the approach employed in these activities, reaching the different social groups and working with them in pilot locations. This methodology, along with its related strategies and actions, can be extrapolated to other cases and locations. Its implementation in two pilot cases, Sant'Antioco and Formentera, tested the actions and identified the difficulties and possibilities arising in each case.

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Lessons from vernacular architecture to sustainability

VERSUS METHODOLOGY: DEVELOPMENT AND APPLICATION

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The development of the project *VerSus / Lessons from Vernacular Heritage to Sustainable Architecture* (2012-2014)[1], constitutes the conceptual genesis of *VerSus+ / Heritage for People* (2019-2023). The two projects were developed in partnership by Escola Superior Gallaecia (ESG, now at Universidade Portucalense - UPT), Universitat Politècnica de València (UPV), University of Florence (UNIFI), University of Cagliari (UNICA), and CRAterre-ENSAG, in the framework of the Creative Europe programme. The *VerSus* project outcomes (available at: esg.pt/*VerSus*) produced important results in a short-term period, which created expectations regarding its medium and long-range impacts (Carlos et al., 2014) (Correia, Dipasquale, & Mecca, 2014), especially following the European Commission award in 2016, which recognised the *VerSus* project as a success story "for its impact, contribution to policy-making, innovative results and creative approach - a source of inspiration for others" (Creative Europe Project Results Platform, 2016). In 2017, the project also won the ADDIPA European Award for Architecture Heritage Intervention (3rd Edition, category D).

The long-term overview of the *VerSus* project resulted in several authors learning from the project, such as Olukoya & Atanda (2020), who mention the *VerSus* project's holistic overview of vernacular architecture and sustainability, or Aktürk, & Fluck's (2022) case study application as a response to climate.

For the *VerSus* partners, it was important to approach vernacular heritage and sustainable architecture using a consistent methodology, capable of systematisation and of external application, within and outside the participating institutions. This was perceived by several authors, such as Ovalı, & Delibaş (2016) or Castro Fiorito (2016), among others, when analysing and applying the *VerSus* methodology.

There was also a rising interest in the *VerSus* conceptual approach, as well as in the application of the *VerSus* methodology. Some authors, such as Ovalı & Delibaş (2016) refer that these were *VerSus* most known learned lessons, during and after the completion of the project. From thematic support for technical workshops, to the methodological basis of Master's and Doctoral theses, but also for the development of architectural works, the *VerSus* Project has been consolidating itself internationally, going beyond institutional committees and networks. *VerSus* has been considered a reference, both as a method and as a tool, and has driven researchers to focus on its operational approach, especially as an

[1] The project *VerSus Lessons from Vernacular Heritage to Sustainable Architecture* (2012-2014) was coordinated by Escola Superior Gallaecia, a school of architecture and multimedia that was integrated in 2021, into Portucalense University (UPT) in Porto, Portugal, as the new Department of Architecture and Multimedia Gallaecia (DAMG).
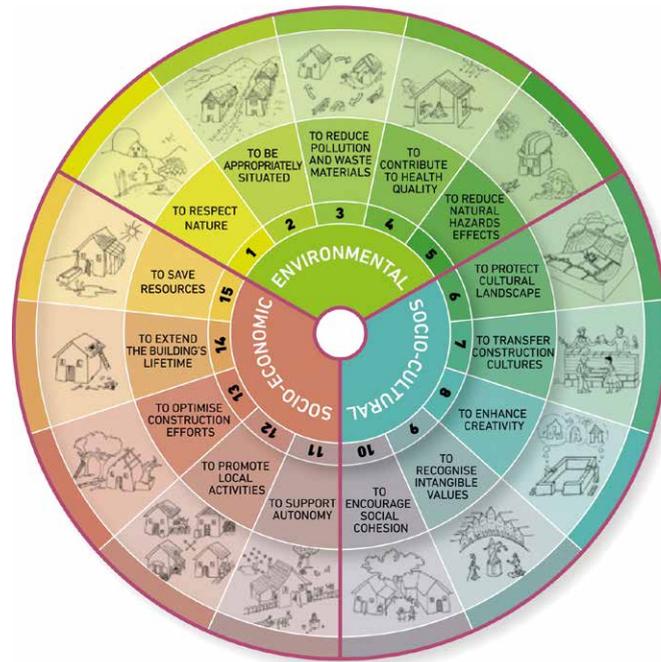
➔
Wheel of the sustainability principles identified in the *VerSus* project
(credits: CRAterre)

instrument for sustainable development. This was detected, for instance, by authors such as Germanà (2021), Castro Fiorito (2016), or Cardoso Martínez (2016).

According to the *VerSus* project aims, the method was based on research developed through case studies, systematising the contents in a reversible reading structure, of a recurring nature. This structure started from an analytical decomposition, defined by sequential steps, similar to what can be designated as analytical categories. In this specific case, the innovation was brought about, by the fact that its implementation was intended to constitute both an interpretative and an operative tool, useful for the study of heritage and for architectural design (Correia et al., 2014).

This operative method, or approach, established a direct link between what was designated as a principle of sustainability (initially linked to an anthropological need), a resolution strategy, a generic solution and, finally, a concrete and specific example.

These concrete examples, which were decisive for the validation of the developed conceptual framework, were used as case studies (Carlos et al. 2014). The choice of case studies was based on an extensive documentation produced by the partners over more than 20 years of prior work in the area of vernacular heritage, thus justifying the institutional consortium gathered for the project. For the most part, the data presented was collected through fieldwork techniques, constituting original or updated survey processes by the research team. A very broad sample from the analysed cases, 52 in total were selected for the publication *VerSus*: Heritage for Tomorrow (Correia, Dipasquale, & Mecca, 2014). From those, 32 cases addressed the vernacular architecture character, and 20 cases had a contemporary architecture approach.

The representativeness of the project was associated with two aspects: the specificity of the principle of sustainability and its urban/architectural morpho-typology. The principle of sustainability required a profound review of the state of the art, namely with regard to the evolution of the term and its conceptual scope. In addition to the publications considered as a reference in the scientific area, research-work

was developed through a selection of current classification systems aligned with the premises established by the European Union.

In the designation of areas, the interpretation of results was carried out through the study of specific architectural indicators. This option was intended to avoid vague and subjective generalisations that would undermine the perception of its practical usefulness, as encouraged by Vellinga (2013). From the comprehensive review of these aspects, a first categorisation emerged, which divided the intervention and its structure into three fundamental areas, which in turn derived into principles and associated strategies:

1. *The environmental scope*: based on the capacity to integrate buildings with the environmental features of a place, limiting the negative impacts, also in relation to climate change;

2. *The sociocultural scope*: based on the capacity to guarantee and strengthen the sense of belonging, cultural diversity, local knowledge and know-how, personal and community well-being, social cohesion and the recognition of inherited values (CRAterre, 2014);

3. *The socioeconomic scope*: based on the capacity to produce and maintain income and social well-being within the territory, empowering communities.

Due to the project's operational aspect, the *VerSus* team kept in mind the need for the project to make use of participatory processes, involving both researchers and students. Thus, it was clear that it would be through graduate and post-graduate student research that the receptivity of the methodology would become more noticeable.

Besides, throughout the process, a series of scientific workshops were used as a tool for validating the analytical system. These workshops were always organised together with the Project's plenary meetings, so that the results had a direct impact on the development of the methodology. The workshops were always preceded by a scientific seminar, in which the research team presented the methodology under development and some of the case studies analysed to that point. Following the seminar, students and

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Posters of the winning projects of the 2014 student competition
(credits: authors of the posters)

teachers were invited to a thematic session, where they applied the *VerSus* methodology in concrete situations, simultaneously analysing pre-selected cases of vernacular heritage and of contemporary architecture.

Throughout the five scientific seminars and workshops held in Portugal, Spain, Italy and France, the need to develop a structure that would allow for an intuitive interpretation became clear. In this way, research work was developed in order to increase the *VerSus* conceptual synthesis and graphic expression, which would help improve the understanding of *VerSus* approach. The workshop format was also a key-contribution for the development of the *VerSus* method and results.

Writing the pedagogical texts concerning the *VerSus* project for the publication *Heritage for Tomorrow*, helped clarify the overall operative method of the project. The use of representative samples, both in geographic and typological terms, allowed the team of researchers to validate the scope and the diversity of the approach. The last methodological systematisation, complemented with the contribution of all partners, determined the identification of 5 principles for each of the 3 areas, which were in accordance with the fundamental objectives associated with the origin of the vernacular heritage that was studied. These 5 principles corresponded, in turn, to other strategies, which also included the analysed solutions. These objectives could also be understood as qualities inherent to specific architectural features, regardless of their vernacular classification. As a result, this led to the development of a basic system for assess-

ing the sustainability of interventions, with a particular focus on the potential to predict their value, even during the design phase of the project.

According to the *VerSus* holistic approach, the quality of the analysed work was not based on statistical efficiency of compliance with a certain principle, but, rather, on the pursuit of an effective balance between the designated areas. Using this method, the greater the number of principles identified within the designated areas, the more grounded and consistent the analysed cases and the proposed solutions.

The *VerSus* method was applied in a pedagogical context and with the participation of professionals, which allowed testing the implementation of the work being developed in similar contexts and in complementary studies. Throughout the following years, a variety of examples of its application emerged, which demonstrated a greater capacity for critical consideration of the *VerSus* Project, in the form of Master's dissertations and Doctoral Theses, with a greater emphasis on environmental and socioeconomic sustainability. Several experiences were observed in the context of study programmes of graduate degrees in Architecture, in which *VerSus* publications were used as essential course material.

The *VerSus* project and method contributed to a better understanding and respect for the intelligent approach inherent to vernacular heritage, as well as to its contribution to a more sustainable architecture in todays' world of fast and immediate responses.

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TRANSMISSION OF THE VERSUS METHOD TO ARCHITECTURE STUDENTS AND LECTURERS

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Eight years after their publication, it is interesting to look at the impact that the two *VerSus* books have had on architectural education. The authors of these publications, all architecture lecturers, unanimously agree that *VerSus* has spread far more widely than we could have imagined. Thanks to the publications, the *VerSus* wheel comes up easily in web search engines whenever students or teachers undertake research that seeks to weave links between vernacular architecture and contemporary design. Architecture courses incorporating *VerSus* analysis can be seen in a wide variety of contexts including outside Europe. Some teachers adopt the tool on their own, others call on one of the 5 initial project partners to explain how to proceed. Three main uses by students and their lecturers can be identified:

- contextual analysis prior to a design
- analysis of student projects
- analysis of contemporary projects.

Context analysis

In the case of context analysis, *VerSus* is used to understand places in their cultural landscape dimension. When teachers send their students to a municipality with remarkable vernacular architecture to collect data for the design of a sustainable project, *VerSus* proves very useful because it curbs in the students the prime instinct of architects which is to look for the aesthetic dimension of buildings. By using the *VerSus* grid, they go deeper into their analysis of the situation. On the environmental side, for example, in addition to being interested in the landscape integration of buildings, they will question the origin of the material resources as well as the relationship between the buildings and the climate. In this way, buildings that would not have attracted their attention because of their modest aesthetic qualities can turn out to be brilliant in bioclimatic terms. The same applies to the socio-economic and socio-cultural dimensions of the analysis grid, which forces the students to enter into the thinking of the craftspeople at the time in order to question their design logic. They thus seek to answer questions such as: "why did they settle in this place?", "why did they use such a material in such a place?", "what were the tools and forms of mutual aid mobilised for this construction?", "what were the trades of the time?", "with what type of maintenance have these constructions survived the centuries?", etc. If, in addition to conducting their study as simple outside observers, the students have the time to organise a presentation-debate with the inhabitants, they gain an even richer level of knowledge of the site. When

explaining the 15 *VerSus* principles through examples to local people, the inhabitants in turn ask themselves questions and quickly describe what they have in their village that is comparable. At the end of the session, they sometimes invite the students into their homes or into parts of the village that had not been studied in order to discover new treasures.

Analysis of student projects

The *VerSus* tool can be used in a second step to help students in their design process. By designing with *VerSus* in mind, they are able to better channel their ideas and better structure the narrative that they will use to defend their project in front of lecturers. *VerSus* serves as a checklist for them to continually self-assess their progress and identify weaknesses in their proposals. They are thus able to separate what is

already successful from what still needs to be improved. The tool also forces them to consider dimensions that they would not necessarily have studied. On a technical level, they anticipate, for example, how their project will be built, used and maintained in the long term. If wood is the ideal material for this location because a local industry is already operational, they will talk to local craftspeople to find out which wood species they can work with on their machines, the size of their workshops, the power of their lifting equipment, etc. In this way, they ensure that they do not design elements that will need to be prefabricated elsewhere. Likewise, they avoid the stresses on the site and the extra costs that unrealistic designs would generate. On the human level, they also manage to develop relevant social interactions favouring conviviality, the transfer of knowledge or the possibility of shared uses. It is possible to achieve the same results without *VerSus*, yet in our opinion the 15 criteria grid facilitates the design process.

Keith and Marie Zawistowsky, a couple of teachers at the Grenoble School of Architecture, who supervise the design/buildLAB studio (www.designbuildlab.org), use the *VerSus* tool in the design phase of their projects. Their teaching is structured around the realisation of real projects which allows them to confront students with design and construction simultaneously. The architecture they produce with students emerge from an intimate understanding of people and places, and this has become their trademark. Using the *VerSus* tool, they encourage students to review their projects from different angles of observation, so that every opportunity to enrich the design is explored. *VerSus* has not changed their very human approach to architecture, but it does help them to better convey their ideas.

Analysis of contemporary projects

Another use that has been widely developed since the publication of *VerSus* is the analysis of contemporary projects. This use was already suggested at the end of the *VerSus* booklet published in 2014 with the analysis of 8 projects. However, these examples did not go into detail. As part of the teaching process, students are generally asked to work in small groups of 2 to 3 people so that their analysis can be debated by several people and the discussions within the group can help develop the students' critical thinking skills and their ability to construct an argument. When working alone, the participants certainly do think, but they do not go through this phase of confrontation of ideas with their peers, which seems to us to be essential. The analysis of contemporary projects can be done over half a day or a whole week. The more time the students have, the more detail they can go into. We therefore recommend devoting several days to this exercise. If they have a whole week, then they spend about 2 days reviewing the published literature on the selected project in order to complete the 15 criteria grid, separating the positive and negative inputs to each criterion. At the end of the two days, they can present a *VerSus* wheel marked red where the project is weak and green where it is very strong on sustainability. For each of the criteria, there is usually both red and green because perfect projects do not exist. From the third day onwards, armed with their detailed analysis of the project, they will try to make contact with the project's stakeholders: the owner, designers and builders in order to understand the project's development phases.

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House for all in Four, France
Built in 2018 by students from the Grenoble School of Architecture as part of the design/buildLAB courses supervised by Keith and Marie Zawistowski

(credits author)

They sometimes also interview users to ensure that the exceptional results touted in publications are indeed real, in terms of functionality or thermal comfort, for example. This exchange provides them with new insights, particularly on the challenges encountered during the construction phase or the problems encountered by the designers in gaining acceptance for unconventional materials and techniques. The remaining days of the week are used to finalise a 15 to 30-page dossier which they present to their classmates, giving them an additional opportunity to analyse an architecture on the basis of a structured argument.

The choice of projects is usually theirs. We recommend that they choose a project that they admire in terms of sustainable development. The conclusions of this exercise are often the same for the students. They appreciate being able to enter into the intimacy of a project that they seemed to know well and that turns out to be much more complex than they imagined. Their perspective changes completely between the beginning and the end of the exercise. By spending time investigating what they considered to be a model project, they discover not only the flaws but also new valuable elements, some of which they had missed.

VerSus can therefore be used in a variety of ways and at all stages of the architectural curriculum. Some students keep the grid to propose analyses in their Master's theses. What seems essential to us is to be able to inscribe this 15-criteria analysis grid in the minds of students so that they acquire the reflex of analysing architecture in a transversal way. Thinking in this way allows playing with the parameters in a careful way during the design phase and to avoid any gross distortion by developing one criterion too much to the detriment of the others. The grid also allows students to perceive intelligence everywhere, even in buildings that seem insignificant or even ugly at first glance.

However, it must continue to be made clear that *VerSus* is about extracting the intelligence that led to the creation of vernacular architecture and not simply duplicating those buildings that have lasted for centuries. Some of *VerSus*'s detractors may have complained that the tool seeks to regress architecture by forcing 21st century humans to live as they did in the Middle Ages. This is not the case, *VerSus* simply requires an understanding of the balances of the past in order to better measure the balances of today.

Furthermore, *VerSus* should not be used in place of other tools such as life cycle analysis grids or energy grids proposed by various construction labels in Europe. *VerSus* remains a qualitative, rather than a quantitative tool.

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FROM INTANGIBLE HERITAGE TO CIRCULAR KNOWLEDGE

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VerSus+ / Heritage for People project and the previous *VerSus / Lessons from Vernacular Heritage to Sustainable Architecture* project have focused on the intangible dimension of the vernacular architectural heritage, a heritage of mainly tacit technical and scientific knowledge characterised by a high level of diversity. Intangible heritage refers to the living expressions and practices inherited from our ancestors, including traditions, rituals, music, dance, oral histories, craftsmanship, and other forms of cultural knowledge which rely on the active transmission and sharing of knowledge between individuals and communities. This knowledge is not confined to textbooks or formal education systems but is rather passed down through informal channels, such as storytelling, apprenticeships, and communal practices. This continuous transmission has ensured that the knowledge remains alive and relevant, allowing future generations to learn, practice, and reinterpret it. Indeed, intangible heritage is not static; it is able to adapt to changing social, cultural, and environmental contexts.

Traditional technical know-how refers to the specialised knowledge, skills, and techniques that have been developed and passed down through generations within traditional and indigenous communities. It encompasses the traditional practices, craftsmanship, and expertise associated with specific trades, crafts, or professions. This kind of knowledge is characterised by its adaptability, sustainability, and resource efficiency. It is rooted in the principles of circular economy, such as the reuse, repair, and recycling of materials, as well as the optimisation of resource use and waste reduction. Such a knowledge system is often closely tied to cultural traditions, natural resource management, and sustainable livelihoods, and it plays a vital role in preserving cultural identities, fostering community resilience, and contributing to the sustainable development of societies

VerSus+ / Heritage for People project is based on the concept that communities can engage creatively with their intangible heritage, incorporating new elements and ideas while retaining its essence. This adaptability fosters innovation and enables the knowledge to remain vibrant and meaningful in contemporary society. When we study traditional technical knowledge, and in particular architectural knowledge, trying to codify the elements useful for the design of conservation and restoration work, renovation or new buildings, we perform an important operation, transforming this know-how into circular knowledge.

Circular knowledge as relevant part of circular economy

Circular knowledge can be defined as a type of knowledge that forms a closed loop, where the information or understanding obtained is shared, reused, and regenerated within a community or society. The

opposite page
A student working on the analysis of a traditional building in Formentera, Spain
(credits: T. D'Intino)

basis of this approach is a continuous flow, exchange, and application of knowledge, with the aim of fostering innovation, sustainability, and societal development. To promote circular knowledge, it is necessary to encourage collaboration, information sharing, learning from historical experiences, fostering innovation, and actively involving stakeholders. Its validity for sustainable development is linked to the ability to recognise its dynamic nature and its potential for adaptation, transformation, and regeneration to address contemporary challenges and promote positive change.

Circular knowledge can be considered a relevant part of the broader concept of a circular economy. The circular economy is an economic model that aims to minimise waste, optimise the use of resources, and foster sustainability by promoting the reuse, recycling, and regeneration of materials and products. Circular knowledge complements the principles of a circular economy by focusing on the sharing, reuse, and regeneration of knowledge within society.

Intangible heritage reflects the rich cultural diversity of different communities around the world. Circular knowledge recognises the importance of diverse perspectives and encourages intergenerational dialogue. In the case of intangible heritage, older generations share their knowledge and experiences with younger generations, fostering a sense of continuity and cultural identity. This exchange of knowledge strengthens social cohesion and promotes understanding and respect for diverse cultural practices. Circular knowledge encourages sustainable practices by emphasising the conservation and revitalisation of traditional knowledge and skills. By integrating intangible heritage into sustainable development strategies, communities can ensure the preservation of their cultural identities while contributing to the well-being of their environment and society.
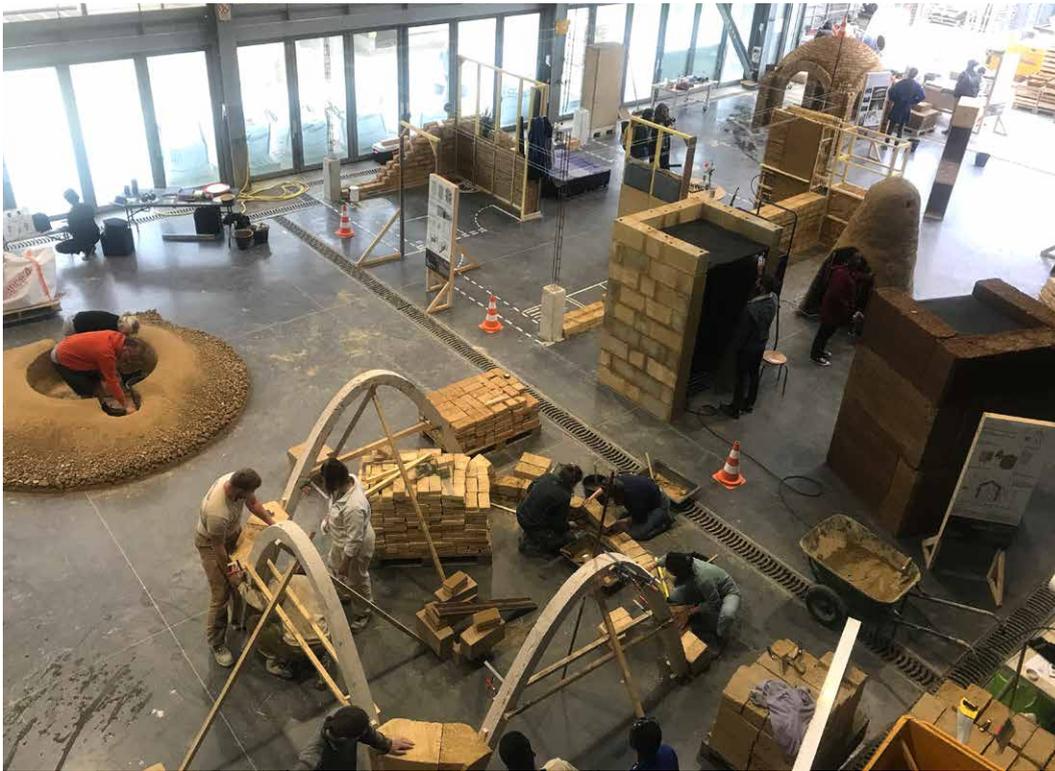
From a circular knowledge perspective, the dynamic nature of intangible heritage and its potential for transmission, adaptation and regeneration is thus recognised. This perspective highlights the role of communities, intergenerational dialogue, and sustainable practices in preserving and revitalising cultural traditions and knowledge for future generations, which is the aim and meaning of the project line from *VerSus / Lessons from Vernacular Heritage to Sustainable Architecture* to the present *VerSus+/ Heritage for People*.

Based on the lessons learnt in this project, we can identify some principles for the implementation of circular knowledge processes to promote a more sustainable and resilient future.

- *Knowledge sharing and collaboration*: encouraging the sharing of expertise, best practices, and lessons learned among different stakeholders, such as researchers, businesses, communities, and policymakers. By sharing knowledge, valuable insights can be gained, leading to the the acceleration of the transition to a sustainable development.

- *Learning from the past*: acknowledging the value of traditional knowledge and practices inherited from previous generations. By studying and understanding past approaches, societies can extract lessons and insights to inform present-day strategies.

- *Innovation and continuous improvement*: fostering innovation and continuous improvement by encouraging the regeneration and reinterpretation of existing knowledge.

- *Engaging stakeholders and community participation*: Fostering the circular knowledge means encouraging the active involvement of individuals in the creation, interpretation, and regeneration of knowledge. Community members play a crucial role in keeping the knowledge alive through their

continuous engagement, participation in rituals and festivals, and the transmission of skills and traditions. By sharing knowledge and building capacity, circular knowledge initiatives facilitate the capacity to develop sustainable solutions and create a more resource-efficient and resilient future by enabling stakeholders to make informed decisions and take meaningful actions.

The role of circular traditional knowledge for the sustainability and resilience of human ecosystems

Circular traditional technical knowledge plays a crucial role in promoting sustainability and resilience within human ecosystems. As evidenced by the investigation and experiences conducted, it is evident that traditional knowledge encompasses various crucial facets that are pertinent in addressing contemporary global environmental and societal concerns.

- *Sustainable Resource Management*: traditional technical knowledge frequently encompasses practises that effectively facilitate sustainable resource management. Indigenous and traditional communities have developed intricate systems and techniques for utilising natural resources in a sustainable manner. This includes methods for selective harvesting, rotational farming, water management, and biodiversity conservation. By integrating such knowledge into contemporary practices, human ecosystems can achieve long-term sustainability by ensuring the responsible use and preservation of natural resources.

- *Adaptation to Environmental Changes*: human ecosystems are constantly exposed to environmental changes, including climate variability, natural disasters, and ecological shifts. Circular traditional technical knowledge holds valuable insights into adaptation strategies that have been developed and refined over generations. This knowledge equips communities with the skills and practices necessary to adapt to changing environmental conditions. It enables them to respond to challenges such as changing rainfall patterns, loss of biodiversity, or shifts in agricultural productivity, thereby enhancing the resilience of human ecosystems.

- *Conservation of Cultural Heritage*: circular traditional technical knowledge is often closely tied to preservation of cultural heritage. Preserving and revitalizing this knowledge is crucial for maintaining cultural diversity and promoting social cohesion within human ecosystems. By safeguarding traditional knowledge systems, communities can reinforce their cultural values, knowledge transmission mechanisms, and intergenerational dialogue. This conservation of cultural heritage contributes to the overall resilience and well-being of human ecosystems by fostering a sense of identity, community pride, and social cohesion.

- *Local Economic Development*: traditional technical knowledge can provide the foundation for sustainable and locally appropriate economic activities. Traditional crafts, agriculture, fishing techniques, and other practices rooted in circular traditional technical knowledge offer opportunities

for livelihoods that are well-suited to local ecosystems and cultural contexts. By promoting these traditional economic activities, human ecosystems can enhance their resilience by reducing dependence on external inputs, diversifying livelihood options, and strengthening local economies.

- *Knowledge Transfer and Community Empowerment*: traditional technical knowledge is typically transmitted through community-based learning processes and hands-on experiences. This knowledge transfer fosters community empowerment by valuing and involving local expertise. By recognising and integrating circular traditional technical knowledge into decision-making processes, policies, and education systems, human ecosystems can empower local communities to actively participate in the management and governance of their resources. This involvement strengthens the resilience of human ecosystems by fostering a sense of ownership, promoting sustainable practices, and ensuring the continuity of traditional knowledge systems.

Hence, the incorporation of traditional technical knowledge into present-day practises and policies has the potential to enhance the capabilities of human ecosystems in addressing environmental issues, promoting social welfare, and guaranteeing the long-term sustainability of natural and cultural resources.

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INDIGENOUS & TRADITIONAL KNOWLEDGE SYSTEMS AND THE CIRCULAR PARADIGM

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Scientific research is increasingly aware of the role and benefits of indigenous knowledge systems in science, education and the practice of natural environment management. These components are slowly being recognised in other fields, such as planning and design, food and agriculture; this inclusion promotes more respectful and equal decision-making, as well as new perspectives on the meanings and concepts of sustainability. It also opens up dialogue for constructive planning procedures derived from the indigenous worldview. This includes a regenerative planning paradigm that places culture, climate and ecosystem needs at the core of sustainability.

Climate change and global crises since the COVID-19 health emergency have highlighted weaknesses in resource and value chains, necessitating a shift in global policies. At the European level, the Circular Economy Action Plan (CEAP) aims at the transition from a linear society to a carbon-neutral, environmentally sustainable, toxic-free and fully circular economy by 2050. But in order to achieve a transition from the current linear, polluting and wasteful economy to a circular and sustainable economy, a systemic and holistic approach is essential, and above all a radical paradigm shift.

I will try to show that the circular paradigm is closely related to the Indigenous and Traditional Knowledges paradigm and that the latter can offer innovative ways of thinking and approaches, a real toolbox for designing for adaptation and resilience in the face of climate change and other human-induced challenges.

The paradigm of circularity, so closely related to that of sustainability, replaces the linear process typical of modern industrial economies, introducing a principle of efficiency extended to the appropriate use or reuse of all resources. The circular paradigm requires thinking in cycles, working regeneratively and within the systems of nature, eliminating waste, and thinking about the interconnections of all actions in a systemic manner. This translates into the famous 3 R's - Reduce, Reuse, Recycle - but also into other important concepts, emphasising the cyclical nature of a closed system, which finds a point of equilibrium precisely in the inversion of the entropic balance, through the regenerative principle: Re-birth, Re-start, Re-new, Re-pare...

This is not such a new concept if you think that up to 70 years ago, our grandparents did not throw anything away and reused and recycled almost everything: old clothes were used to make blankets or carpets, olive oil was used to make soap, and so on, but above all, every object or utensil was carefully kept, repaired, fixed and passed on for generations. Isolation, or much more simply the greater difficulties of

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Reconstruction of a retaining dry wall near Schio, Dolomites, Italy
(credits: E.P. Ferrari)

travel and communication, made it necessary to have strong, collaborative communities in which all individuals worked together for the common good.

In the small villages scattered in often difficult and isolated areas - as is the case with the oases or mountain settlements of the High and Middle Atlas in North Africa, but also in our Alps - we often find ourselves faced with almost monumental agrarian or hydraulic settlements, which did not originate from an organisation of centralised power, but rather from social systems organised according to rules of widespread democracy, based on mutual aid and solidarity. Such social systems required each member to contribute labour to what were considered collective goods, whether it was the construction of a granary, an underground canal for water supply, terracing or the harvesting of grain.

So-called advanced societies believed that through technological progress one could free oneself from environmental and social dependence by promoting a principle of linear and unlimited growth, in which each individual is essentially disconnected from other species and nature. This culture, which is indifferent to places and their qualities, has produced irreparable damage that today threatens the ecological balance of the entire planet. The observation of societies and settlements that have developed under difficult, if not extreme, environmental conditions offer us an alternative type of relationship with the environment based on the renewable and regenerative use of resources through 'soft' environmental control and design actions.

These extreme environmental conditions have set insurmountable limits, within which ways of life have developed that rely on a perfect but very fragile balance, developing refined and ingenious technologies based on the careful and scrupulous use of rare and precious resources in which the life cycles of all species, water, waste, and food, are integrated into the social structure and life of the community.

Cohesion, sharing, solidarity, collaboration, mutual aid are the principles underlying survival in such

harsh environmental conditions and, perhaps, the current state of the planet, with climate change and the progressive depletion of available resources, place us in a similar situation. It is no coincidence that today we speak of sharing economy, frugal economy, and blue economy in those practices that are related to the concept of Social Innovation. These are practices that arise from below from social urgencies or simply from a growing awareness, which seek to respond innovatively to society's needs by building new social and community relations. We are thinking of car sharing, co-housing or BlaBla car, supported by the widespread diffusion of advanced technologies, borrowing from traditional housing or collective transport systems still widely diffused in Africa and in some developing countries.

We can say that the genesis of the circular paradigm - now finally fully understood as a necessary condition for sustainability - finds its roots in certain pre-industrial socio-economic models based on traditional knowledge (Traditional & Indigenous Knowledge System).

Over the past decade, the international community has recognised the value of the traditional knowledge system and proposed its integration into climate change response strategies. The United Nations Framework Convention on Climate Change (UNFCCC) at its 2010 conference in Cancún recognised the need to integrate the traditional knowledge system into the process of assessing and responding to current environmental and climate challenges. The ability to read variations in environmental conditions in natural signals and to absorb their impact (resilience), the profound knowledge of local environmental conditions expressed in indicators that only seemingly have no scientific value (the movements of fire ants, the flowering of the mango tree, the direction of local winds, the flight of certain birds, the moment when the cuckoo's cry begins, the moment when the winged termites swarm, or the colour of the sky), constitute a heritage that cannot be ignored and that duly utilised can constitute a response to climate change and above all can contribute to the empowerment of local and indigenous populations.

Traditional and Indigenous Knowledge, is the body of knowledge, innovations, know-how, practices, and representations, linked to the tradition of a territory, people or a community. These sophisticated knowledge sets are closely connected to the social and cultural system and in turn determine a meta-physical and ontological model - insofar as they set the criteria from a formal language - that in some ways differs profoundly from what commonly emerges from rationalist and linear thinking.

Traditional and indigenous knowledge is part of a complex system deeply connected to the system of social relations and its effectiveness depends on interactions between several factors: natural, environmental, or material limits, social and relational needs, religious and cosmogonic conceptions: all these elements are assumed and concur in the search for the technical solution to a given problem. The holism that characterises traditional societies materialises in a space of connections and relationships between elements in which several subjects dialogue, transforming it from within. This complexity is approached in a syncretic manner and solutions are never specific but generally have to respond to several criteria. Thus, for example, in conceiving the distribution system of the canals in the gardens of an oasis, an order is concealed, in reality a very rigid one, of customary rights over water, in the division of plots one can read the hereditary passages of a family and the subdivisions that have been carried out over time.

Any traditional practice is never an expedient to solve a single problem but is always an elaborate and multifunctional method closely linked to a worldview based on the careful management of local resources. Terracing, for example, is at the same time a way to protect a slope, reconstitute soils, and collect water. Multi-functionality has ensured success over time even in adversity. The functionality and success of a solution is measured over the long term through the sharing of collective knowledge that is passed on from generation to generation.

In addition to these virtuous values, traditional knowledge responds to ethical and aesthetic canons of balance, harmony and beauty by charging artefacts with a profound symbolic meaning in a continuous play of references and analogies between technique, art and nature. The production of objects or structures often takes place according to ritualised procedures, the reason for which is difficult to understand immediately, yet this permeates the artefacts or practices with a profound spiritual essence: sacred lakes and woods often preserve rare and endangered species, the consecration of constructions in various phases of realisation, the protection from evil in the openings of dwellings that is implemented by throwing lime milk with ample ritual gestures, which in turn protects from water and disinfects by eliminating any germs and insects that may infest them.

Rationalist thinking induces a dualistic and opposing view of the concepts of 'tradition' and 'modernity', identifying 'tradition' with something static and unchanging in time, while 'modernity' would constitute what is new, dynamic, revolutionary.

All societies, including traditional ones, have always developed strategies to respond to change, which have proven successful when they have been able to integrate existing elements into the transformation,

that in many cases have proved to be strengths. Communities have always had to deal with climatic variability, the unpredictability of the environment, wars, famines, large population movements due to events occurring in faraway places. These events led to sudden moments of rupture, which in turn required a transformation of societies, customs, of ways of living and producing. Traditional knowledge has been forged in changing environments, developing innovative systems of adaptation and response to adversity, using resources without compromising nature's capacity to regenerate them, and assuming models anchored to specific local situations and from a systemic perspective of sustainability.

Traditional knowledge and practices constitute a dynamic system capable of incorporating innovation because they have been consolidated, transformed and adapted over long-time spans that have made it possible to control their evolution.

To summarise, it can be said that traditional knowledge systems respond to certain principles that integrate surprisingly well with those underlying the circular economy paradigm:

- integrated and multifunctional solutions;
- a systemic and holistic approach;
- functionality measured in the long term;
- regeneration of resources;
- adaptation to the environment;
- resilience;
- autopoiesis.

Studying these models and starting from these principles offers interesting prospects for designing the radical change that now seems inevitable to ensure the survival of the planet itself.

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DIVERSITY AND SUSTAINABILITY OF TRADITIONAL ARCHITECTURE IN GLOBAL WARMING AND ECOLOGICAL AND DIGITAL TRANSITIONS

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A change and three transitions

In this beginning of the third decade of the 20th century, humanity is faced with a scenario that has never before been so complex: the hope for a better future and for an equitable and sustainable well-being, combined with the reduction of all inequalities, must be measured against a change and three epochal transitions: global warming and its effect of climate change, including the many different climates on earth, and ecological, digital and demographic transitions. In the face of this new complexity, the need for a systemic and innovative perspective on human and natural ecosystems, combined with the need for the health of all living beings that is clearly expressed by the concept of 'One Health'[1], is reinforced. In recent decades, the growing emergence of so many voices, starting with 'The Limits of Development' promoted by the Club of Rome at the instigation of Aurelio Peccei, and not least Pope Francis' Encyclical 'Laudato sii' itself, has affirmed the need to open up a radically new relationship between man and nature, a new and complex vision of human-natural ecosystems.

Today, this means critically reviewing the industrial/urban development process of the last two centuries, a process that exploits and consumes natural, human and cultural resources in an uncontrolled manner, changing the geography of places, altering the relationship of communities and people with nature and their own history, generating emissions that alter the environment and the life and health of all living beings, reducing biological and cultural diversity and constituting in itself a determining factor (to a greater or lesser extent according to different analyses) of global warming.

Demographic pressure and concentration in 'strong' urban areas across the planet not only increases spatial inequality, but also reinforces the need to allocate additional resources that become necessary to mitigate the non-sustainability of 'dense' urban systems: this accentuates the causes of inequality within 'weak' areas and at the same time the inequalities within 'strong' areas.

This process has an increasingly unsustainable ecological cost. The multiple non-sustainability brought about by the concentration of settlements manifests itself in all fundamental environmental dimensions, such as water, air, soil, energy, biological and cultural diversity, environmental and

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Underground grape press (*rutt*) in Pietragalla, Italy
(credits: author)

[1] The holistic 'One Health' vision, a health model based on the integration of different disciplines, is both ancient and current. It is based on the recognition that human health, animal health and the health of the ecosystem are inextricably linked. It is officially recognised by the European Commission and all international organisations as a relevant strategy in all areas that benefit from the collaboration between different disciplines (doctors, veterinarians, architects, environmentalists, economists, sociologists, etc.).

architectural heritage; it also generates self-sustaining and incremental dynamics for all management processes (public transport, private transport, child and school services, health services, residence, etc.) that 'smart cities' technologies partially mitigate.

The epochal changes and transitions that await us require us to think and build, day by day, a new way of living and producing. A way of life that can ensure an equitably distributed and sustainable well-being, as well as the health of human and natural ecosystems, a new direction for policies at all scales, for communities and local administrations, and for research and education.

Ecosystem diversity and proximity

Ecological and digital transitions once again give the territory a central role, not only because the spatial dimension of ecosystems is ineliminable, but also because human activities take place in a territory and an environment, they are a component of the ecosystem. The well-being of living beings is determined by the quality of the environment with which they interact and the ecosystem services that this environment is able to generate, that is water, air, soil, energy, and the diversity, both biological and cultural, of the ecosystem, as well as the knowledge and awareness of it.

If we accept this change of perspective regarding environmental and digital transitions and place ecosystems and the communities that thrive in their territories at the centre, we discover that traditional knowledge systems can be a great reservoir of energy and potential sustainable growth in the ecological and digital transition and climate change induced by global warming.

The diversity[2], both biological and socio-cultural, of more or less 'urban' ecosystems and the proximity (expressing individual and collective relationships with diversity, physical and virtual accessibility to places and spaces, and relational proximity between people, places, nature and intangible heritage) take on a new central role in understanding, designing and managing the complexity of ecosystems in transition. The re-balancing of the diversity and proximity of ecosystems will only be possible by reversing the process that generates inequalities, marginalises genders, generations and territories, knowledge and traditional architectural and environmental practices; conversely, the diversity and proximity of ecosystems become the necessary, albeit not sufficient, condition for opening up to a new economic, social, cultural and demographic generativity of ecosystems, and to new ways of living.

Global warming and adaptation: an ecological vision

The issue of planetary global warming and of how, in a chaotic way, this changes the climate in different places is increasingly at the centre of the global debate, the attention and concern of international

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[2] The complexity of natural ecosystems is obtained by calculating biodiversity, in other words the diversity of living species. The calculation of biodiversity in natural ecosystems is transferred to urban ecosystems by calculating the diversity of urban organisations, which play a role in urban ecosystems similar to that of living organisms in natural ecosystems.

bodies and the concern of citizens, even though there is still debate about credible and complex cause and effect relationships between the factors that actually determine global warming and between this and the climates that influence our life on the planet.

Ecology has progressively introduced us to a complex, systemic and holistic scientific vision of the environment and life in all its forms, a vision that is to-day indispensable for analysing, shaping and managing the relationship between mankind and the environment, a relationship that has changed and continues to change due to the technologies related to the exploitation of natural resources, to communication technologies and to industrialisation/urbanisation processes that have developed over the last two centuries.

Well-being based on healthy ecosystems

The real challenge is to address the new complexity generated by ecological, digital and demographic transitions and the simultaneous adaptation of our societies to the changing climate by improving the level of well-being and reducing inequalities in well-being for all living beings, in accordance with the One Health perspective.

The One Health perspective does not only apply to the most vulnerable populations, it applies to all communities because it means prioritising all key environmental components, such as water, air, soil, energy (renewable and with minimal impact), biological and cultural diversity, all of which make up the whole of those ecosystem services that are indispensable to ensure life, both today and for future generations.

The challenge of adapting to global warming

A strategy for adapting to climate change can be implemented either by changing our interaction with the environment, in other words by modifying our ways of living and producing, or by migrating to places where the living conditions, both for individuals and for the species as a whole are more acceptable, that is where it is easier to adapt with less consumption of resources in order to achieve the same degree of well-being. Ecological and digital transitions are the new, and necessary, technologies with which we can construct the complex strategies of adaptation, of modifying our interaction with the ecological systems of which we are a part.

The urban policies that are being developed, from the 'smart city' to urban regeneration and urban forestation, are aimed at changing the dense and structured settlements that we have created over the last two centuries; the underlying assumption is that climate change can be managed by improving the efficiency and resilience of the settlements created according to the development model that has generated the global unsustainability in which we are living. My assessment is that the 'One Health' goal of the ecosystems in which we live requires a systematic adaptation strategy by reversing migration flows to areas that are climatically more compatible with ecosystem diversity and health, and with better and more equitable living conditions for people.

This option is not yet officially on the political agendas for the built environment; instead, migration is undertaken chaotically and yet increasingly by millions of people seeking new places to live for them and their children: the signs are clear: this is a trait of the demographic transition towards sustainable settlements.

The ecological transition that rebalances and reduces territorial inequalities, together with the digital transition that dematerialises many activities, digitalises processes and separates labour from the work-place, re-attributes value to traditional settlements, traditional architecture, and local and indigenous knowledge systems that characterise hill and mountain areas that have been man-made over the centuries and are rich in biological and cultural diversity.

Traditional ecosystems take on the role, both geographically and scientifically, of strategic areas in a logic of material and immaterial circular economy and adaptation to climate change, because they can make it possible to achieve the essential conditions of well-being and sustainability (air, water and soil, biological diversity, energy) by enhancing the intangible heritage of knowledge developed by communities in their interaction with the environment over the centuries and through the different climatic fluctuations.

Many settlements, in a logic of global circular economy, can and must be re-generated by adapting them to the new requirements of well-being and sustainability with the benefit of preserving and enhancing diversity with fewer resources and less impact on ecosystems.

All possible renewable energy production is equally distributed in space, the same applies to the other dimensions of sustainability, such as air, water, soil, and diversity. Criteria of circular economy, neutralisation of CO_2 emissions and production of renewable energy can allow for more effective and efficient regeneration/generation of settlements in inland and hilly areas and a response to the needs for people's well-being, individual and community ecological awareness and responsibility, and conservation of both hydro-geological balances and diversity.

Sustainable Communities for new ecosystems

Ecological awareness and responsibility, both individual and communal, requires that a new and systemic level of ecosystem management be established to address climate change and sustainability, recognising the unprecedented ecological, social, economic and political threats to dignified life on planet earth. These threats have been provoked by centuries of ongoing extractive and exploitative institutional systems and practices, a structural dependence on unconstrained economic growth, and the unfettered spread of unsustainable lifestyles. The political, administrative, cultural and environmental future for managing the complexity of ecosystems according to a 'One Health' vision lies in Sustainable Communities. Thousands of pioneering local initiatives across Europe and the world, thousands of researches on vernacular architectural heritage, all the activities of ICOMOS groups such as ISCE AH, all the projects that we as partners have carried out, such as Terra Europae, *VerSus* and others, have

developed, implemented and refined collective approaches responding to the pressing sustainability challenges: permaculture and ecovillage design, nature-based solutions, local exchange trading systems, social enterprising, open source appropriate technologies, inner transition, voluntary simplicity, peer learning and support, facilitation of multi-stakeholder networks, participatory governance, co-creation methods, etc.

New Sustainable Communities can become the new actors, not only at the political and administrative level, but also at the social and scientific, capable of leading the ecological transition into the future, thanks to the digital revolution, scientific research applied to ecosystems, community awareness and responsibility and the regular and supportive sharing of experiences, solutions and management tools. Sustainable communities that can coordinate and integrate major and minor settlements, without hierarchies, places of culture, history and environmental knowledge of the territory, can thus be the subject for the experimentation of new energy models, totally powered by renewable sources, by small Smart Grids, areas dedicated to energy production and energy storage, places of innovation and new ecological and digital entrepreneurship, the places where, moreover, this energy has always been produced and where local communities played, and can still play, a leading role

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LESSONS ON CONSERVATION FROM VERNACULAR ARCHITECTURE

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Vernacular architecture, which is the result of the accumulated wisdom of centuries of processes and trial and error has much to teach us not only regarding the design of a more sustainable contemporary architecture, but also the discipline of the restoration of built heritage. This architecture, which is not monumental, has no particular pedigree, and is designed without architects, also entails an approach that involves intervening on the existing buildings which is worthy of analysis given its current potential for application. This approach can be reflected in the concepts of continuity, maintenance, repair, naturalness, recycling and resilience, as detailed below.

Continuity

Vernacular architecture, both urban and rural, generally highlights the continuity of existing structures, driven by saving on materials and energy already embedded in the existing building. Occasional population growth usually accompanied the horizontal expansion of settlements, while technological innovations were gradually incorporated into existing buildings. In the 18th and 19th centuries, especially in some historic centres, except for expansions and urban reforms, the option of raising, transforming and redecorating façades of historic buildings was favoured over that of demolishing and building new constructions. This desire for aesthetic transformation was a result of academic architecture and demographic pressure brought about by increasing economic development (Mileto, Vegas, 2015). Existing brick walls, joinery, floors or roofs were reused and transformed adapting them to new needs when necessary, but were rarely demolished in order to be rebuilt. Thus, for example, the traditional wooden windows with no glazing and covered with frames with linen fabric to let light – but not wind – in, which are typical of much of traditional Mediterranean culture, but rather repurposed as the use of glazing gradually became more popular between the 18th and 20th centuries. This type of radical demolition of the existing building to be completely replaced, probably with at least one or two more floors, was more often seen in the second half of the 20th century or even the early 21st century, in a culture of consumerism and waste with no guarantees for the future and with repercussions which are only now being recognised.

Maintenance

Vernacular culture has historically been based on maintaining traditions, trades and architecture. Dwellings received continuous care, often determined by the pace of the agricultural operations which

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A repaired roof in Biertan, Romania
(credits: F. Vegas, C. Mileto)

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Medieval façade raised and converted at the end of the 18th century into a new façade following the needs of the building in Valencia, Spain
(credits: AHV, extracted from Mileto C., Vegas F. 2015, Centro histórico de Valencia. Ocho siglos de arquitectura residencial)
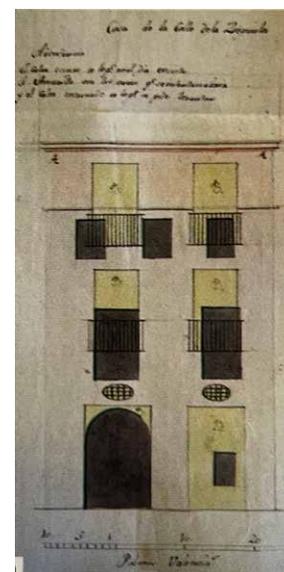
↑
Preparing the red ochre paint typical of Scandinavia for conserving exposed timber structures in Rauma, Finland

Example of this red ochre paint applied both to a brick wall and to exposed timber in Rauma, Finland

(credits: F. Vegas, C. Mileto)

fed its inhabitants. Mud renderings were redone following the rainy season; tiled roofs were patched up in times when there was little agricultural work to be done; plant roofs were renewed when the material started to thin and rot; limewashes were reapplied annually; a coat of linseed oil was applied to wood for conservation; etc. This continuous care, timely and regular, eliminated the need for high long-term investments. Studies carried out on this topic show the economic advisability of regular investment in maintenance compared to the higher cost and occasional trauma caused by expenditure on unplanned restoration (De Miguel Alcalá, Pardo Redondo, 2015).

As in construction, this type of maintenance was normally executed, fully or in part, by the residents. The distribution of the cost of a vernacular construction and its habitual maintenance was based much more on this self-construction manual labour than on the materials or the once almost non-existent machinery. The arrival of industrialisation brought with it a series of changes: the introduction of modern manufactured or industrial materials which required less initial maintenance but were later more difficult to reuse, leading to new use and throwaway patterns; the improvement of communications and commerce which allowed access to these new modern materials; and the specialisation of labour and gradual elimination of self-construction. As a result of all this, traditional constructive trades used for both new constructions and the maintenance of vernacular architecture were lost. The studies in pursuit of environmental decarbonisation and 2030 Sustainable Development Goals call for the reversal of this situation and favour investment in building labour as opposed to the amount allocated to manufactured materials and machinery, without detriment to the budget (Vegas et al., 2021).

Repair

Vernacular culture provides us with routines for the repair of elements rather than the more expensive, traumatic and radical option of replacement. This does not mean that vernacular culture forbids the replacement of damaged elements, but rather that it will always first attempt to repair these elements

before suggesting their replacement. Repairs conceived in this way are the simplest and most immediate and natural solutions to occasional problems arising in certain structural elements or in the construction of walls.

This is the case for example of broken or splintered joists and rounded wooden logs which are repaired simply by screwing on an iron plate; iron staples or clips added for cracked pillars or lintels; abutments added to a leaning wall in danger of collapse; buttresses added to walls to improve the support of a beam; provisional shoring which becomes permanent to improve the support of beams with visible rot at the ends; etc.

Naturalness

Vernacular culture, and with it vernacular architecture, is characterised by its immediacy and simple solutions, poetry consisting solely of naked, constructive and material prose, rarely or barely decorated. Interventions for vernacular restoration, expansion or transformation should answer to the same philosophy. These are natural, honest and spontaneous actions which are easily integrated into vernacular constructions. This contrasts with the option of excessive action on damaged elements using excessively complicated designs which may even erase the original features of these elements. Work is carried out on a building in keeping with vernacular traditional techniques, in a simple, plain and straightforward way that harmonises with the spontaneity of the conception of the original vernacular construction.

However, in recent decades, the traditional naturalness of these vernacular interventions often falls apart with the introduction of constructive materials that are foreign to the vernacular context of the existing building. It is interesting to note how in most cases constructive techniques are still the same local vernacular techniques, although the traditional materials have been replaced. Generally, the building materials used are industrially produced and foreign to the surroundings where this vernacular

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Broken joist repaired by simply screwing on an iron plate at the Convent of the Carmelites, Caravaca de la Cruz, Murcia, Spain
(credits: Francisco Sandoval)

Buttresses added to walls to improve their stability at San Miguel Church (1610) in Santa Fe, New Mexico, USA

Repairing the putty of an old window, Rauma, Finland
(credits: F. Vegas, C. Mileto)
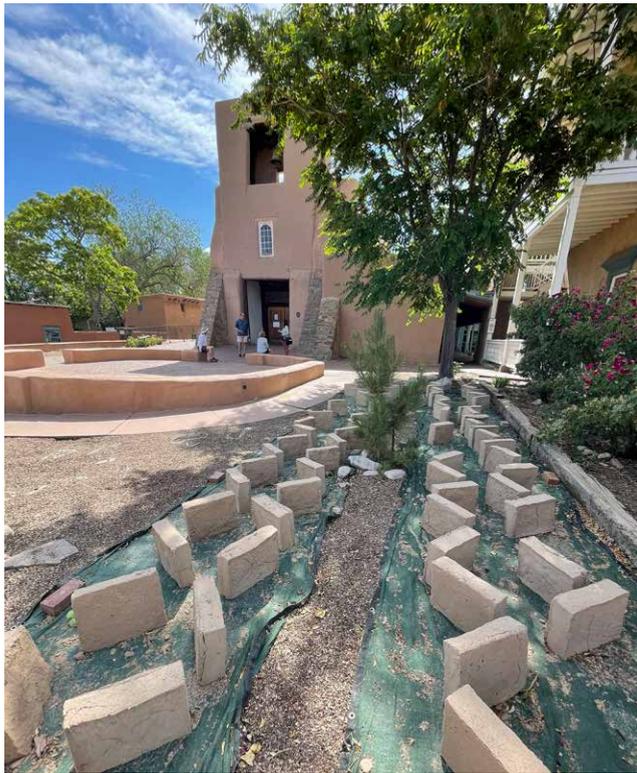
↑
Adobes being dried to naturally repair San Miguel Church (1610), also built with adobes, Santa Fe, New Mexico, USA

Traditional steep roof thought for heavy snow, being repaired, Archita, Romania

(credits: F. Vegas, C. Mileto)

architecture was born: commercial brick or precast blocks in stone settings, Portland cement mortars, cement concrete, ribbed sheet metal, fibre cement panels, aluminium or PVC joinery, etc.

Recycling

Another lesson to be learnt from vernacular culture in the field of restoration is the repurposing or reuse of single elements or building materials. Indeed, in the rare instance in which an individual element no longer fulfils its original function, it is common to find a second life for it within a vernacular construction. The options for repurposing may be direct, with no transformation of any sort, in what can be defined as upcycling; or may be indirect, like an intermediate phase of processing, downcycling or remanufacturing, in what can be described as recycling.

Examples of this are the reuse of mill wheels for plinths or bases; the reuse of large spindles from wooden presses as lintels; the use of half horseshoes to affix the roof purlin to façade sill beams or to hang cured meats from the joists; the use of old gypsum rubble as masonry for the walls; the second calcination of this gypsum rubble to make twice-fired gypsum; the use of old roof tiles or brick as shards to gallet masonry or chamotte to produce hydraulic mortars such as cocciopesto; etc. Thus, vernacular culture did not generate waste but instead imaginatively used objects which had lost their function as constructive elements or materials.

Resilience

Over time, vernacular architecture has successfully introduced mechanisms for improvement against atmospheric agents and natural disasters. Its built idiosyncrasy, the result of centuries of experience

and wisdom, has generated architectural solutions which show incredible resilience to local conditions and responses which adapt as circumstances change. Modern restoration has much to learn from these constructive solutions of vernacular architecture, which can be reproduced or reinterpreted to create new solutions. Moreover, it is best not to ignore or contradict these solutions with unnatural ones which later turn out to have limited durability and little probability of success.

The angle of sloping roofs and their waterproofing materials (tiles, slate, straw, shingles, etc.) are the result of a harmonious equation with local rainfall; the wide eaves of the roof protect the façades from the impact and runoff of rain; the stone masonry walls on the ground floor bonded with mud prevent rising damp; braces in timber and sometimes iron protect walls and pillars from settlement and earth movements; the timber tie beams in the walls aid building stability offering protection from these movements; tiled vaults can be used to avoid excessive weight providing the spandrels are reinforced with little partition walls to increase stability under all circumstances; the ventilation or plastering of the ends of the beams and joists in the masonry construction prevent them from rotting; the use of timber felled when the winter moon is waning to limit the presence of sap, sometimes transported by river that helps removing albumin and dried thoroughly following a natural process prevents later episodes of rot and the attack of xylophagous insects; etc.

Conclusion

This architecture, which is as simple and anonymous as it is wise and considered, has provided a great many lessons on the conservation and restoration of both monuments and vernacular architecture itself. This deliberately simple and unaffected restoration leaves the main focus on historic architecture while also seeking to minimise the carbon footprint and achieve maximum sustainability in all respects. This restoration, born from the stance of an architecture without architects, could be termed restoration without architects. However, one thing should be made clear: the aim is not to promote a completely uncontrolled restoration, without specialists in charge, but to teach the healthy attitudes of vernacular culture, a form of intervention which respects the character and material nature of historic buildings, as well as natural and built settings and the surrounding environment.

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VERNACULAR PARAMETERS OF SUSTAINABILITY IN 21ST CENTURY ARCHITECTURE

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After nearly a quarter of the 21st century has elapsed with an ever increasing emphasis on sustainability, energy, environmental, global and local social issues, it seems appropriate to review the present situation. This analysis can help identify new lessons learned from vernacular architecture, ascertain how far these have been applied in contemporary architecture, and stimulate the development of new connections and possibilities. The parameters that arise from this vernacular-inspired contemporary 21st century architecture can be broadly summarised in four concepts: place, people, needs and materials.

- *Place*: this key aspect of architecture involves a good knowledge of environmental conditions to successfully select a suitable location, wisely chosen to fit in with the surroundings; these conditions include physical features, such as weather, climate, topography, winds, orientation and views.

- *People*: the social, cultural and economic context of the location should be taken into consideration both in the design and construction stages, and their skilful incorporation in these processes is crucial to a successful sustainable outcome.

- *Needs*: the skill to identify both physical and spiritual needs, accommodating them in appropriate forms, is as important as providing flexibility and adaptability for future changes.

- *Materials*: the selection of materials has immediate consequences for sustainability, affecting issues such as costs, local or remote sourcing, energy needed for their production and transportation, building construction processes, durability, maintenance, possibility of dismantling, recycling and reusing, pollution and waste reduction.

The representative - but not exhaustive - overview provided below gives some brief examples of these new attitudes of 21st century architecture. These attitudes, which are inspired by the parameters of vernacular architecture, are also far removed from the iconic architecture of the star architects typical of the 20th and early 21st centuries, up until the start of the 2008 economic crisis. The selection of these outstanding examples is based on accredited and reliable distinctions provided by international awards with worldwide recognition, such as the Global Award for Sustainable Architecture, supported by the Cité de l'architecture et du Patrimoine and UNESCO, or the International Award for Sustainable Architecture, supported by Fassa Bortolo and the Università degli Studi di Ferrara. Other relevant works are found in the Architecture guide to the 17 UN Sustainable Development Goals, published by the Royal Danish Academy and the UIA. The selected works will be surveyed taking into consideration relevant parameters of architecture and sustainability.

opposite page
Community Center in Dalla designed by Abari, Nepal, 2019
(credits: Nripal Adhikari)

⬆
Mapungbuwe Interpretation Center, South Africa

A building as an extension of nature in the landscape
(credits: Peter Rich, 2009)

Interior carved out space breaking the order of the vaults
(credits: Iwan Baan 2010, courtesy of Peter Rich)

Eyelid detail. Five tile thickness plus stone cladding
(credits: Obie Oberholzer 2015, Courtesy of Peter Rich)

The Mapungubwe Interpretation Centre in South Africa, designed by Peter Rich, is an example of a close bond between the work and the site, a National Park of important historical and archaeological value. The rocky landscape was the inspiration and source of the materials for the tile vaulting of the pavilions, which were built by local people trained in the manufacturing of earth tiles and the construction of tile vaults. Another case study showing the influence of place is the Kindergarten for the permaculture community *Poret* in Zimbabwe, designed by Anna Heringer, which showcases an approach that takes full advantage of existing local potential and resources, in order to accept, quoting the architect, "the ability of buildings to turn to compost or to go back to earth without harming the environment [...] The best thing is, when nothing remains from a building but the know-how and skills to make it better." Anna Heringer's work in Asia also emphasises the use of local materials like earth and bamboo, as well as local skills and craftsmanship, involving local people in the design and construction of the works.

The involvement of local communities is a strategy of vernacular architecture that is currently widely present in all projects. It is important to highlight the social and cultural context of works, which provides an invaluable background of experience, expertise and creativity that can be incorporated into the design and construction processes to the mutual benefit of designers and the local population. One example of these synergies is the work of *Abari*, led by Nripal Adhikary, in Nepal, struck by a major earthquake in 2015. In the reconstruction of schools such as Janajyoti Primary School or Saraswati Secondary School, the local community was trained in "new technologies and skills to build earthquake resistant homes using locally available earth and bamboo". A brick press was implemented to allow local people to make earthen bricks, and designers and builders were always on site to obtain insight and feedback from the users. This is actually an open source system, allowing changes from all participants. Locals have learned how to build with local resources, and that experience enabled them to rebuild their damaged homes on their own. The school will also house a "tool library" for the local community, so that anyone can borrow any tools to build their homes or create things, a sort of rural innovation cen-

tre. Abari has adapted the so-called 'Owner Driven Reconstruction' participatory model to the vernacular Nepali architecture, minimising the use of manufactured and imported materials, and releasing a number of open source small design manuals to help people build transitional shelters or classrooms, a permanent school, a compressed earth block house, or showing permanent housing prototypes.

Recycling materials in new constructions is an ancient vernacular strategy which avoids discarding waste into the environment while rooting the project in a given place. An example of this is Wang Shu's Ningbo History Museum with its characteristic façade mostly made up of debris gathered from a wide area around it, originally occupied by traditional Chinese villages which had been demolished to leave room for new developments. This work and other similar buildings designed by him, therefore, intend to recover a sense of place, and a settlement's identity, by recycling bricks and tiles dating back over a thousand years. They are packed using a traditional technique called *wapan*, with the collaboration of craftsmen, to produce a stable structure with a richly textured coloured cladding.

Concrete and metal structures have ceased to be the sole stars of contemporary architecture, which is now opening up to experimentation and construction using traditional materials such as earth, brick, timber and bamboo, among many others. In close connection with the materials and their sourcing, new structures other than the concrete post-and-beam scheme based upon traditional techniques are found in the selected examples: load-bearing walls, mostly built with rammed earth or pressed brick masonry; trusses, mostly built with bamboo, both flat and space; arches, vaults and domes, built primarily using tile vaulting; and frames, made up of bamboo space trusses, or bamboo post-and-beam construction, or arched timber planks resting on an upper central hub, like the supporting frame of the Kindergarten for the *Poret* permaculture community in Zimbabwe.

Madan Puraskar Pustakalaya (MPP) is the name given to a national library and archive in Nepal, housing more than 40,000 books and documents of historical relevance for the country. After the damage suffered in the 2015 earthquake, secure seismic-resistant reconstruction was carried out using locally

Madan Puraskar Pustakalaya designed by Abari. Lalitpur, Nepal, 2015
(credits: Asish Rajbansh)

Kopila Valley School designed by Abari. Surkhet, Nepal, 2015
(credits: Chemo Dorje Lama)

Owner-driven reconstruction manual
(credits: Abari)
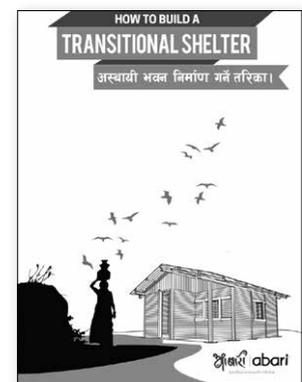
⬆
School designed by Francis Kéré, Dano, Burkina Faso, 2013
(credits: authors)

available bamboo and mud tiles. An overall structure of spaced trussed frames made up of bamboo rods and polyhedral knots, encompassing the full two-storey height of the building, was built.

Schools in remote rural areas with difficult accessibility must rely very heavily on local materials and population. The Saraswati Secondary School in Nepal was rebuilt after the 2015 earthquake, providing enclosed classroom spaces with open covered playground areas between them. Load-bearing seismic-resistant walls consisted of a thin linear reinforced concrete framework with infills of pressed earth brick masonry, and the roof was supported by flat bamboo trusses. In Bangladesh, the METI School is a successful representation of its architect's motto: "Architecture is a tool to improve lives" (Anna Heringer). Work with the local population inspired self-confidence and strengthened their identity, after discovering the wealth and possibilities of available materials, labour and know-how in their closest environment. In this case load-bearing walls on the ground floor level were built with rammed earth, and the upper floor roof bamboo structure was made up of beams supported by vertical post pairs and diagonal braces.

Education and health are two essential public assistance services that must be guaranteed even in the remotest areas of the territory. The Anandaloy Building in the village of Rudrapur (Bangladesh) hosts a therapy centre for people with disabilities and a textile studio. It was built upon the experience gained from previous projects by Anna Heringer in the same village using local materials: mud and bamboo. These were used in a creative way, not just because of the low cost, but also in an effort to take advantage of them to their full potential. With a specific mud technique called cob, no formwork is needed and curved walls can easily be built. The building has a curved outline, in contrast with others with a straighter orthogonal layout, and a ramp connects the ground with the upper floor following the peripheral curved walls. This makes it accessible for the disabled and generates very welcoming intermediate spaces in the surrounding covered gallery.

But it is not necessary to look to developing countries to find examples of this new architecture, which

takes its inspiration from the principles of vernacular sustainability. Until recently the reuse of anonymous residential architectures lacking in personality during the years of economic developmentalism would have been unthinkable given the throwaway philosophy which characterised 20th century consumerism. Western European and North American countries with a heavily industrialised background show a vast and consolidated built heritage, which includes large scale social housing blocks built in the Sixties, usually in a poor state of repair and with an alienating social atmosphere. In the Cité du Grand Parc in Bordeaux (France), the architects Anne Lacaton and Jean-Philippe Vassal took up the challenge of preventing demolition and renovating existing buildings, as well as improving the standards, dignifying the habitat and providing a sense of identity. Their approach to the project avoided any major interventions in the existing structure, and was based mainly on additions and extensions, such as a new bay with winter gardens on the south façade and new improved insulation on the north façade. This solution considerably increased the architectural quality of the dwellings and the overall performance of the buildings.

Conclusion

It is striking that architects such as Lacaton and Vassal or Francis Diébedo Kéré, following this philosophy, have recently received a Pritzker Prize given this prestigious award's support of a heterodox and rather iconoclastic approach to contemporary architecture. In fact, the overall feeling is that there is no going back in this new direction taken by contemporary architecture, carefully considering the parameters of sustainability that have always characterised different types of vernacular architecture. 19th and 20th century architecture were two sides of the same coin: in the 19th century, architecture went hand-in-hand with history, while in the 20th century it tried, unsuccessfully, to be a-historical. However, both these architectures showed an obsession with language. The architecture of the 21st century has no choice but to be sustainable in every possible way, learning from the wisdom of vernacular architecture. There is no going back. Our lives depend on it.

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1

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KNOWLEDGE MANAGEMENT AND DISSEMINATION

CONSERVATION AND DESIGN

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The transfer of knowledge is an operation which can take place in the classroom, in the academic field; in a workshop, where the transmission of knowledge from teacher to student can take the form of handcraft; or in actual buildings, where an example may survive for many years, potentially becoming a source of inspiration, not just here and now, but also for a future where many can benefit from it.

opposite page
Building a contemporary chapel with traditonal tile vaulting
(credits: authors)

Indeed, conservation and restoration, rehabilitation and updating, as well as new constructions, all offer opportunities for the transfer of knowledge. And while these strategies have not been implemented during the *VerSus+ / Heritage for People* project, given the obvious difficulty of executing them, they have been considered when writing this book.

Above all, the aim is to provide continuity for built heritage in any of its intervention options (conservation, restoration, rehabilitation, updating), since recovering an existing building, be it vernacular or monumental, built using traditional techniques, ensures a series of results. Firstly, its survival guarantees its continued use as an object of study and example of traditional sustainability for the future, providing the option of explaining the building to laypersons, specialists and those with experience in the field. Secondly, it also enables the transfer of knowledge through the construction specialists and artisans working on a building. It thus provides an opportunity to recover this knowledge, even gathering craftspeople and experts on site in situations where these have been lost in the locality.

The action of extending the lifespan of built heritage in any of the variants mentioned also has other notable advantages. These include the promotion of the local economy, the fight against depopulation, actions against climate change, strengthening cultural identity and the defence of the natural territory and landscape, particularly in rural settings, countering the feeling of alienation resulting from the intrusion of contemporary architecture in a vernacular context. The degree and intensity of these consequences depends on the individual cases, the context and the options selected for the recovery of this heritage by the author/s of the project, although their beneficial effects can generally be stated.

Furthermore, the design and construction of new buildings offers the opportunity to transmit knowledge regarding not only traditional materials and techniques, but also other principles of traditional architecture of the past. These include mechanisms for adapting to the place: geographical location, adaptation to the climate, solar exposure, ventilation, etc. In the design process, the author of the project should strive to understand and analyse the sustainability strategies for traditional architecture, reinterpreting these and transferring them to the new building. During the construction process, craftspeople

and artisans also become agents for the transfer of knowledge. Thus, this intangible knowledge is reproduced and prolonged by being reflected in a new example of architecture. Just like a restored traditional building, the new building also becomes a witness and material example of this knowledge, potentially becoming subject to explanations.

Similarly, the action of designing and building by resorting to the mysteries of traditional architecture has parallel consequences with an impact that is basically proportional to the extent to which traditional materials and techniques are used in the new building. This encourages respect for the surrounding natural and cultural landscape, enhancing cultural identity, aiding the fight against climate change and preventing the effect of alienation stemming from new architecture in sensitive settings.

In short, professional practice, whether restoration, rehabilitation or new construction, involving all stakeholders, from the architect or quantity surveyor to the residents, users or visitors, passing through artisans, master builders and the different building trades, provides a unique opportunity to transmit the sustainability values of vernacular principles. This endures long beyond the time of construction and lasts the lifespan of the building, making it irrefutable proof of all the above. In addition, conserving, restoring, rehabilitating or building in this way allows these spaces and buildings, brimming with sustainability and in balance with the environment, to be inhabited, lived and experienced, thus also ensuring the survival of these principles.

Experimental house designed by Alvar Aalto, where several brick fabrics were tested with various pieces and bonding in search of an expressiveness of the traditional material for modern architecture. Muraatsalo, Finland

Lookout cabin designed by Snøhetta, where the mastery of carpenters specialised in traditional boat building is combined with contemporary design. Innlandet, Norway

(credits: authors)

CONSERVATION AND RESTORATION OF TRADITIONAL ARCHITECTURE

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Traditional architecture goes beyond an established concept or image. It does not respond only to its builders' project, engineered and manufactured from arcana and artisanal gestures (Vegas, Mileto, 2011). The architectural forms which have evolved over centuries are not merely the result of the local availability of materials and climate conditions, but the result of many centuries of trial and error. In addition to these factors we find another vital component: culture. Traditional culture is made up of the trades, processes and techniques, the relationship with the territory and the landscape, the forms of use of architecture and its status as framework for socialisation. Traditional architecture is therefore not only tangible heritage, but also an important intangible heritage which cannot be separated from it.

This brings up the need to question what is conserved when restoration work is carried out on traditional architecture. Undoubtedly, the building as object is conserved, but at the same time so is all the intangible baggage of the architecture, contemplating the history of its culture, tradition, materials, ancient construction techniques, and probably also its connection with the surroundings, manufacturing processes, transmission of knowledge to guarantee its survival, etc. (Mileto et al., 2020).

The conservation of traditional architecture is not an exercise limited solely to protecting or freezing a building but is also a dynamic action, which has the capacity to transmit knowledge, educate and raise awareness among owners, residents, intervention stakeholders, tourists and the general public. This is a feedback process, as the greater the awareness, the higher the expectations for the protection and conservation of other examples of vernacular architecture, both locally and beyond.

In view of the complex nature of traditional architecture, what are we conserving when we undertake the restoration of a traditional vernacular building?

The answer is nuanced, since the restoration of traditional architecture, when carried out with respect, sensitivity and full awareness of its substance, entails, among other things, the conservation of the material form, the reactivation of trades, the promotion of the local economy, the fight against depopulation, the reaffirmation of cultural identity, the defence of the natural territory and landscape, the promotion of sustainable tourism, and actions against climate change.

opposite page
Sod constructions, Iceland. The conservation and enhancement of the vernacular architecture typical of each place also favours the reaffirmation of the local identity
(credits: authors)

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The material conservation in wooden architecture in Finland means replacing damaged parts over time using the same construction techniques

The conservation of traditional thatched houses in Miyama (Japan) has encouraged the revitalisation of the thatching craft

(credits: authors)

Conservation of the material form

The restoration of traditional architecture aims mainly to preserve the material form of the original building in a manner compatible with its intended new use or distribution and installation updates to contemporary standards. Often, material conservation also entails the preservation of the typical construction or imprints of the artisanal execution of this type of building, which are so closely linked to the human experience of traditional master builders. In material terms, the conservation of the building is also the conservation of an object which can be further studied in the future as a source of knowledge concerning materials, construction techniques, degradation or conservation processes, and traditional prevention and conservation processes. Furthermore, the restoration of a given type of architecture requires a deliberate attempt to understand the previous uses and functions of these spaces, their reciprocal relationship and distribution, their relationship to people and social and family structures, as well as aspects such as lighting, ventilation, regulation of temperature and sun exposure, etc.

Renewed popularity of trades

The restoration of traditional architecture often also entails the conservation or promotion of local or regional traditional trades. Restoration does not always equal the reproduction of parts, elements, or techniques belonging to historic architecture, but it does require a knowledge and understanding of the architecture of the past in order to repair it.

Traditional trades which are actively conserved and safe from globalising construction trends allow both the filling of the *lacunae* found in the building and the repair of its construction. In extreme cases, where traditional trades have completely disappeared, restoration offers the opportunity to rediscover materials and techniques, reactivating them through use.

Promotion of the local economy

This reactivation of trades not only affects the survival of this individual artisanal and manufacturing culture, but also the promotion of the local economy. In fact, for the same cost, the investment in restoration, particularly the restoration of vernacular architecture, leads to a higher percentage of local labour hired compared to new constructions, where higher percentages are allocated to the acquisition of pre-mixed or prefabricated materials, usually in locations far from the construction (Mileto, Vegas, 2006).

Fight against depopulation

A second and equally important consequence of the reactivation of trades is the settlement of population in areas which are often rural and at risk of depopulation. If local economic activity provides the necessary living means to support a family, not only does the local population remain, but there is also an influx of people in search of work. This has been the case in rural areas which welcome manual labour from other countries to cover the growing demand.

Reaffirmation of cultural identity

The restoration of the traditional architecture of a given area, with its authentic character, simply strengthens its personality and distinctive nature when compared to other regions and to other transformed or globalised urban settlements. This defence of individual culture with reference to the built matter generates or strengthens the feeling of identity and, as a result, a growing desire to respect and conserve it from external interference that is not strictly necessary.

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Historic center of La Alberca, Salamanca, Spain.
The conservation of environments with their original vernacular character also promotes sustainable tourism

Half-timber wall in Garganta La Olla, Cáceres, Spain.
The restoration of vernacular architecture instead of its possible replacement constitutes an action to fight against climate change due to the enormous savings of energy and carbon emissions into the atmosphere
(credits: authors)

Defence of the natural territory and landscape

For a number of reasons the restoration of existing traditional architecture does not only involve the re-affirmation of cultural identity but also often the defence of the surrounding natural territory and landscape. From the outset it avoids the need for the construction of new buildings using contemporary materials and techniques which often distort the surroundings; it is a preventive measure against unnecessary or excessive growth of nuclei through expansions, at least whenever there are historic buildings available for reuse, and it reduces the impact on quarries and the exploitation of materials in the immediate surroundings of traditional locations.

Promotion of sustainable tourism

The conservation of cultural identity also attracts sustainable tourism, often directed to inland nuclei and regions in areas where there is no coast. These tourists visit the sites in question attracted by the integration of natural and cultural landscape and the authentic vernacular architecture which can still be found in them.

Action against climate change

The restoration of traditional architecture, especially when resorting to traditional local construction materials and techniques, characteristically sustainable and circular in nature, is also a silent and anonymous, yet ultimately powerful action in the fight against climate change. Recent studies have estimated savings of up to 80% compared to the carbon footprint caused by the new construction of a similar building and 50% in relation to the carbon footprint generated by a restoration using industrial materials (Mileto et al., 2021). Therefore, while from the perspective of climate change it is convenient to conserve the existing building, its restoration using traditional construction materials and techniques is also doubly useful and efficient.

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RESTORATION OF A VERNACULAR HOUSE IN SESGA, VALENCIA (ES)

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This humble house which, based on the dendrochronological analysis, was originally built in 1732, was reconstructed and enlarged during the Forties of the 20th century, in both cases using traditional local construction techniques: structural pillars made of gypsum, jack arch floors with logs and gypsum-poured vaulting, thatched and tile roofs, walls in masonry or stone masonry, and partitions made with stone slabs bonded with gypsum. The restoration of this house, which was in a deplorable state of preservation due to being abandoned for fifty years, has made use of local trades, craftsmen and materials, as well as of traditional construction techniques, or an interpretation of them for the sake of compatibility, decarbonisation and sustainability, understood in their broadest sense. The collapsed sections have been reconstructed using wooden logs and gypsum-poured vaulting, the traditional reed board of the roof plane was plastered over; the roof tiles were bonded with a mixture of earth and straw to increase adhesion and flexibility against the movements created by the thermal gradient. The historical carpentry of doors, gates, shutters and partitions have been consolidated, and the masonry walls of the first floor have been grouted with clay, in accordance with tradition, to avoid the rise of humidity by capillarity. After several lab tests using different gypsums and plant-based reinforcements, some innovations, based in tradition, were introduced, such as the compression layers of the floors using gypsum reinforced with reeds or a hemp rope mesh and the plastering reinforced with tightened strings, or the insertion of log ties, the use of traditional waxed gypsum or burnished limecrete pavements, the restoration of the original furniture, etc. Preference has been given to work units with a high proportion of manual labour instead of favouring alternatives with a greater presence of machinery or processed materials, in order to promote the local trades and craftsmen. It has been possible to demonstrate with numbers that restoration interventions benefit the local activity and local economy to a much greater extent than a similar project involving a new construction. Finally, a Life Cycle Assessment of the restoration of this house with local materials and traditional techniques has been carried out, which shows an extraordinary potential in terms of decarbonisation for the environment, not only compared to a new building of similar characteristics, but also compared to a similar restoration carried out with already processed industrial materials.

ARCHITECTS
Fernando Vegas and Camilla Mileto

QUANTITY SURVEYOR
Salvador Tomás Márquez

PROMOTERS
Fernando Vegas and Camilla Mileto
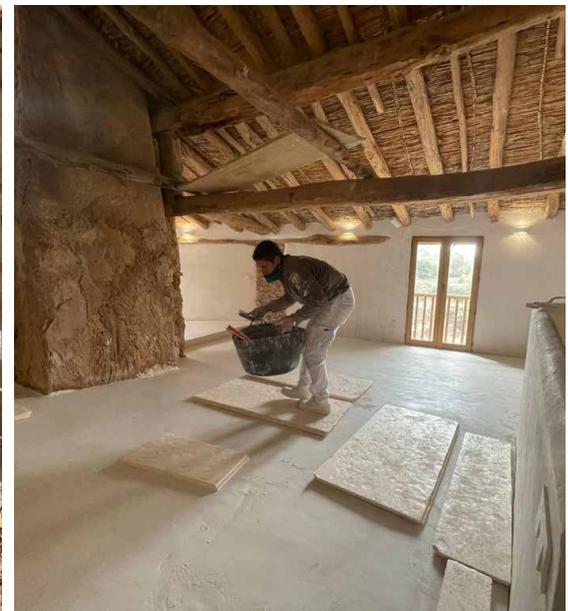
VERSUS SUSTAINABILITY PRINCIPLES
2. Taking benefit from natural and climatic resources
3. Reducing pollution
4. Ensuring environmental comfort and well being
5. Reducing disaster risks
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
11. Supporting autonomy
12. Promoting local activities
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

House at Sesga once restored
Applying the waxed gypsum flooring
(credits: F. Vegas, C. Mileto)

URBAN BUILDING ON CALLE MALDONADO 33, VALENCIA (ES)

Fernando Vegas, Camilla Mileto

Universitat Politècnica de València, Valencia, Spain

This nondescript urban building located in the historic center of Valencia, being under no heritage protection, was initially condemned to be demolished and replaced with another social housing building of similar characteristics. At the proposal of the architects, the building was restored in its current state. Research in the historical archives, with the support of mensiochronology, dendrochronology and chronotypology, and a study of the building's materials and construction techniques, allowed dating its original construction to approximately 1580, as well as subsequent alterations carried out during the second half of the 18th century, in 1864 and 1900, which had concealed its former configuration and true antiquity. The building had been constructed with brick walls, jack arch floors with flat-tile vaulting filled with gypsum and roof with timber rafters and ceramic board covered with tiles. It also included half-timber walls in the courtyard with dovetail joints whose construction dated back to the 18th century. This is a technique that was quite common in the past, yet has practically disappeared from the historic center of Valencia. The project resulted in three social housing apartments, one for each floor, as well as a commercial unit on the ground floor. The inclined floors were reinforced and leveled with wooden trusses; the timber of beams and joists was repaired and the deflection of the joists was leveled with wooden ribs, which also added bearing capacity; the floors were consolidated with a dry compression layer of plywood; the colored cement tiles were restored; the corroded anchorings of the balconies were repaired, as well as all historical ironwork and woodwork; the historical wooden eaves overlooking the courtyard were recovered; a treatment was applied against the termites that were damaging the building; the simple ornamental paintings that decorated the 18th century gypsum jack arch vaulting of the floors were recovered; and finally service installations were upgraded to contemporary residential standards. The result was the same three social housing apartment building which was to be built anew by demolishing the existing building, but at a much lower cost and with an extraordinary added bonus in terms of history, spatial quality and traditional finishings.

ARCHITECTS
Fernando Vegas and Camilla Mileto

QUANTITY SURVEYOR
Francisco Hidalgo Delgado

DEVELOPER
Municipality of Valencia

VERSUS SUSTAINABILITY PRINCIPLES
3. Reducing pollution
4. Ensuring environmental comfort and well being
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources
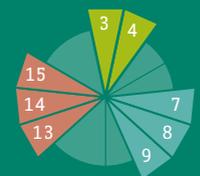
A view of the building from the street
Inside of the restored apartment
(credits: F. Vegas, C. Mileto)

CONSERVATION OF A VALENCIAN BARRACA (ES)

Fernando Vegas, Camilla Mileto
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The *barraca* is a traditional dwelling from the area surrounding the city of Valencia (Spain), found in the southern lagoon area and in the cultivated areas to the north, as well as in the old fishermen's quarters on the Mediterranean coast. This vernacular architecture, housing for fishermen and agricultural workers, is part of the tradition of building around Mediterranean bodies of water, as well as other marshes and lakesides worldwide. *Barraca* walls were built with adobe, wattle-and-daub or cob walls and the roof was thatched on timber structures and reeds. This heritage, which is both local and global and is a clear representation of a now-extinct culture, has long been neglected, replaced and mistreated. Only recently, on the verge of complete extinction, has it been highlighted as cultural heritage and as a source of information on environmental, socio-cultural and socio-economic sustainability in relation to circular economy and climate change. The adapted reuse being carried out in the listed *barraca* of the Aranda family was based both on extensive research aimed to recover materials, techniques, and trades, and on the dissemination of the local and global values of these buildings and the tangible and intangible culture they harbour through lectures, documentaries, technical specialist visits, students, administrations, etc. The aim is to prevent this adapted reuse from remaining merely an isolated action, in order to become instead part of a process which enables knowledge, valorisation, conservation, education, training, awareness and innovation.

The conservation process of the *barraca* of the Aranda family began by dismantling the remains of the timber structure which had collapsed partly due to termite damage. Subsequently, the adobe walls, which were at a 75 degree angle due to the thrust from the roof rafters, were reinforced following the disappearance of the tie beams that provided stability to the structure. This reinforcement consisted in adding a side foundation underpinning in lime concrete and a new adobe wall on the outer side of both longitudinal walls, connecting the new and the original walls so that they work jointly. The timber structure was then assembled, adding the reed board, gypsum render, and other intermediate gypsum and cork layers in compliance with current fire regulations, before thatching the roof back.

ARCHITECTS
Fernando Vegas and Camilla Mileto

QUANTITY SURVEYOR
Salvador Tomás Márquez

BUILDING SUPERVISION
Fernando Vegas, Camilla Mileto and Miguel Ortiz

VERSUS SUSTAINABILITY PRINCIPLES
2. Taking benefit from natural and climatic resources
3. Reducing pollution
4. Ensuring environmental comfort and well being
5. Reducing disaster risks
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
11. Supporting autonomy
12. Promoting local activities
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

➡
Building the reed layer of a traditional barraca
(*credits: S. Tomasi*)

The thatched barraca after restoration

Internal view of the restored thatched barraca
(*credits: V. Jimenez*)

THE SUN TEMPLE (IN)

Edoardo Paolo Ferrari
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The Nyima Lhakhang (Sun Temple) is a 14th century Buddhist temple situated in the area of Purig in Ladakh (Indian Himalayas). Achi Association of India curated its architectural repair. The project focused mostly on the renovation of its roof. Due to increasing rain patterns in the region during the last decade, the traditional flat roofs of both temples and houses have been severely damaged. The extraordinary value of the paintings and inscriptions inside this building required a long lasting yet inexpensive solution to prevent water infiltration. The original flat roof, supported by two main beams, rafters and wooden planks, was covered by 20 cubic metres of compacted earth (approximately 40 cm thick). The under-sized wooden elements suffered from the excessive load of the earth that was gradually added with time, thus four props had been likely placed already several decades ago in the weakest points of the structure (where beams presented small cracks). The new design solution was based on removing the thick earthen layer, thus freeing the horizontal structure from any load so as to overlap a new roof. In order to do this, the two main pillars and capitals were extended vertically by means of customised wooden pieces. With this vertical extension, it was possible to place new main beams and rafters above the original roof that would remain visible inside the temple, yet without any additional load from the new roof above. Once the original horizontal structure was freed from the load it was possible to remove the props and reconstitute the visual and spatial integrity of the original room with its paintings. A series of sloped wooden beams with galvanised metal sheets fixed on top of them have been installed above the new timber structure. The main concept was to achieve a hybrid roof: the main protective layer is constituted by metal sheets with a 6% slope that can withstand protracted rains and heavy snowfall, while at the same time this pitched roof is embedded on the three main elevations within a traditional Ladakhi parapet decorated with willow sticks (locally known as *spedma*) so as to be proportionally and visually congruent with the traditional landscape.

ARCHITECTS
Achi Association India

VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
2. Taking benefit from natural and climatic resources
3. Reducing environmental impact
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
11. Supporting autonomy
12. Promoting local activities
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

Customized timber element for the pillars

New main beams above the original roof afetr removing 20 cubic metres of earth

(credits: E.P. Ferrari)

RENOVATION AND ADAPTIVE REUSE OF VERNACULAR ARCHITECTURE

Letizia Dipasquale
Università degli Studi di Firenze, Florence, Italy

Adaptive reuse: transforming spaces to meet changing needs

The concept of adaptive reuse architecture refers to the practise of renovating, repurposing, or converting existing buildings for a new contemporary use, thus allowing the building to extend its lifespan. This approach contrasts with demolishing old structures to build new ones, thereby contributing to the conservation and enhancement of the environmental, historical, social, and cultural values of the building and its context. Although the processes of renovation and adaptive use of architecture have always been part of the practice of architects, contemporary demands for a more sustainable management of resources and a reduction of environmental impacts impose a renewed awareness of these issues (Lanz, Pendlebury, 2022).

Vernacular heritage possesses inherent resilience and is continuously undergoing evolution, transformation, and adjustment in response to the dynamic requirements of communities and the ever-changing economic, cultural, and social circumstances. As expressed in the Charter of the Built Vernacular Heritage: "Vernacular building […] is a continuing process, including necessary changes and continuous adaptation as a response to social and environmental constraints".

When vernacular architecture fails to adapt, it is often abandoned or deeply altered in an attempt to achieve a concept of modernity that frequently compromises the physical, morphological, and functional attributes of the preexisting structure. Functional obsolescence, structural vulnerability, lack of adherence to safety standards, lack of comfort, obsolete layout organisation, or low energy performance - these are the critical issues most frequently occurring in vernacular architecture today that require inevitable transformations.

Our role is to reactivate the processes of adaptation, counteracting the homogenisation of forms and technological solutions, enhancing local identity, and seeking in the lessons of sustainability expressed by vernacular architecture, the ingredients to drive the transformation and upcycling of vernacular heritage.

The value of regenerating vernacular heritage for a circular economy and sustainable future

Within the scientific literature we find varied recurring terminologies in the field of adaptive reuse: retrofitting, refurbishment, renovation, repair, etc. All these practises are in accordance with the

opposite page
Casa Farfaglia **by Studio GUM architects. Barn converted into a private residence, 2017. Noto, Italy.**

(credits: F. Bamberghi)

Gugalun House (*Haus Truog Gugalun*) by Peter Zumthor, 1994. Versam, Switzerland.
(credits: F. Camus)

objectives expressed by the European Union in achieving a climate-neutral EU by 2050, and with the EU's circular economy action plan (EC, 2020b), which promotes an increase in the circularity of the EU economy, including the built environment as a priority sector. According to the European Commission (EC, 2020) building renovation has a high capacity to influence global climate change targets. Renovating and reusing vernacular buildings promotes environmental sustainability primarily since it reduces the amount of demolition and the need for new construction. Numerous studies have demonstrated that retrofitting and updating processes consume fewer resources and energy, while also generating less waste, thus reducing the overall carbon footprint compared to new construction (Vilches et al., 2017). Vernacular buildings are intrinsically sustainable due to the natural and local materials and low-tech methods used to build them. Traditional materials come with a lower energy cost than many industrial materials and, in the case of biobased materials, such as wood, straw, reeds, etc., act as a carbon store (Dipasquale, Pulselli, 2022). In addition, locally accessible materials safeguard supply and local expertise while reducing transportation costs.

To be effective and contribute significantly to achieving climate neutrality, building renovations should be based on circular principles, and maximum attention should be given to pursuing the following objectives: reducing use of materials and minimising waste, preferring biobased and/or recycled materials, designing for long-term/high durability, increasing the utilisation intensity of buildings (EEA, 2022).

In addition to the great influence on environmental aspects, it is important to emphasise the contribution that retrofit and regeneration processes can make to a more equitable and sustainable development from a social, cultural and economic point of view, thanks to their ability to generate benefits on both the economy and the well-being of inhabitants.

From a cultural point of view, the reuse of vernacular buildings helps to safeguard the unique identity of a place, and to maintain a connection with the collective memory, traditions and intangible heritage.

Regenerating traditional buildings can also have a positive impact on society if they can activate or reactivate collective functions that foster sharing, socialisation, inclusion and community well-being. Reactivating disused or abandoned structures also has benefits from an economic point of view, since it can incentivise local businesses and artisans, attract new businesses, residents, and visitors. Renovation practices can be more cost-effective than building from scratch, especially when considering the potential costs of demolition and the disposal of materials.

Criteria for implementing the sustainability of adaptive reuse and renovation interventions

Managing vernacular heritage transformation processes is a complex and challenging task: it requires the interaction and collaboration of a large number of stakeholders in the decision-making phases and professionals with different specialisations in the design phase. Knowledge must be accurate and interdisciplinary: renovation design rerquires a comprehensive know-how in the fields of building physics, decay and diagnostics, building-installation system, history and local culture, building techniques and materials. In this context, certain criteria are presented that should be pursued in order to effectively incorporate sustainability principles into the renovation and adaptive use of vernacular buildings.

Flexibility, long-term thinking and life cycle of the building

The transformations of vernacular architecture should consider the long-term durability and lifecycle performance of the building. Transformations should be designed to optimise the functionality of the space, preferring a flexible layout that can ensure contemporary needs and functions and adapt to changing uses over time. Many buildings have persevered in an unaltered state for extended periods, mostly due to the limited evolution of their functional requirements and the inherent simplicity of their construction, thus facilitating simple maintenance. The rapid pace of contemporary change requires careful planning towards the implementation of changes and the adoption of new technologies. It is crucial to focus on the long-term viability of the transformations instead of focusing only on immediate benefits. This includes encouraging reversibility, selecting durable materials and implementing appropriate maintenance plans. While the structure may become obsolete, its materials and components retain their inherent value and functionality. The utilisation of modular and/or dry-assembled parts may give better results, thus facilitating the process of deconstruction and reuse (Gorgolewski, 2018).

Compatibility with physical and structural behaviour of the original building

Upgrading techniques and materials must be carefully selected to ensure compatibility with the building systems used in vernacular buildings. Energy and seismic retrofitting should provide structural strength and thermal performance while trying to enhance the capabilities of the existing building, integrating new elements without nullifying the validity of the existing ones.

Energy retrofitting interventions should take into account the great sensitivity of old materials to moisture, the high thermal inertia of the masonry and the influence of the microclimate of the context, whether urban or rural, to improve indoor environmental quality. This can involve enhancing natural lighting, ensuring proper ventilation, using finishings capable of regulating moisture and humidity levels, and selecting low-emission materials to minimise indoor air pollutants.

Structural reinforcement and seismic retrofit interventions, which are essential to ensure the safety of inhabitants, should succeed in strengthening existing structures, trying to favour systems and materials with elastic behaviour, such as wood or steel.

In case of new additions, juxtapositions or extensions, structural elements of the original building may be incapable of bearing the extra loads placed upon them, so providing strength and stability without the loss of original fabric is a prime concern. Lightweight materials may be appropriate for the introduction of new elements, since they reduce the weight on the existing structure.

Using local and low impact building materials

Materials for retrofitting should be selected on the basis of location and availability, as well as life cycle efficiency, through characteristics such as material recyclability, waste reduction and prefabrication.

An effective sustainable adaptive reuse project should begin with a comprehensive review of locally available resources and adjust its goals based on the materials available in proximity of the site and the resources provided by the climate. Traditional materials, such as earth, lime, timber, brick and stone have the capacity to offer long-term performance and durability while, in most cases, addressing concerns about embodied carbon and sustainability. Modern materials can present innovative opportunities, but they should not be the default choice when attempting to innovate a design.

Integrating passive vernacular solutions for energy retrofit

Vernacular buildings often present passive solutions that influence both summer and winter energy performance, which should be restored and enhanced since they can provide benefits in terms of thermo-hygrometric comfort conditions, energy-saving and resource-efficiency. Natural ventilation, shading systems such as shutters, porches, or other shading devices, the thermal mass of the earth, bricks, stone or other heavy materials used in traditional masonry are key elements that can guide the retrofit project and ensure significant energy savings, reducing the need for additional heating or cooling.

Extension of a residence in Penamacor, Portugal
(credits: Creative Space Studio)

Messner House . Adaptive reuse of a barn, by NOA* network of architecture, 2017. Seis Am Schlern (BZ), Italy
(credits: Alex Filz)

Avoiding waste of materials and resources

The provision of incentives in numerous European countries to improve the energy or seismic efficiency of existing buildings, while extending the possibility to many sectors of society, also causes in many cases an excessive increase in demand, consumption and costs of raw materials and technologies used in interventions.

Interventions should consistently reduce the use of resources, especially those which are virgin or energy-intensive. Priority should be placed on promoting reuse and employing materials with a low environmental impact, aligning with the principles of the circular economy.

Ensuring well-being and social justice

Upgrading and adaptive use require high investments that are only amortised in the long term. Due to high costs, cost-saving measures are often applied, especially in cases of energy and seismic upgrading. Many current policies and programmes tackling housing renovation have proven costly, discriminatory and ineffective (Cornelis, 2023). Some programmes do not take into account the differing economic capacities of households, and therefore no targeted measures are provided for lower income groups. In other cases these measures have led to price increases in building raw materials. In other cases retrofits are used as a pretext to raise rents and evict tenants and low-income homeowners. Implementing social safeguards is imperative to ensure that the renovation benefits the most disadvantaged. The objective must always be to ensure inclusive access to renovation actions. Sustainable retrofit interventions should involve the local community, consider its needs and aspirations, and ensure that the

project contributes positively to the social fabric of the area. This may include involving end-users in the design process, providing accessible spaces, preserving community values and promoting social inclusion.

Conclusion

The process of renovating and converting preexisting structures for either new or ongoing purposes is a multifaceted undertaking. It is not a simple aesthetic question concerning the relationship between the old and the new, but rather includes a process of re-evaluation or search for a new balance between different types of values, moving from historical and conservation values to architectural, environmental social and economic values. In transformation processes it is therefore necessary to understand and recover the lessons expressed by the vernacular heritage, which often include devices to adapt to climate and environmental hazards, and then to choose compatible and appropriate solutions that are able to enhance and transmit them, having a clear idea of how the new and old parts will function long into the future.

Design innovation is vital in order to combine modern and traditional, local and universal, industrialised and handcrafted techniques in a sustainable, appropriate and compatible manner, influencing not only forms and building systems but also new functions, capable of generating new economies and positive effects for the society of the future.

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ALCINO CARDOSO HOUSE RENOVATION BY ÁLVARO SIZA (PT)

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Soraya Genin, ISTAR - ISCTE, University Institute of Lisbon, Lisbon, Portugal
Mariana Correia, CIAUD-UPT, Department of Architecture & Multimedia Gallaecia, Portucalense University, Porto, Portugal

The renovation of Alcino Cardoso House (first phase: 1971-1973; second phase: 1988-1991) by the Pritzker Prize winner Álvaro Siza (1933-) is a reference case-study on the way architects can reshape vernacular heritage while preserving its cultural values.

The Alcino Cardoso House was one of the first interventions in pre-existing buildings undertaken by Siza to receive national and international attention. The architectural design consisted on the conservation of vernacular farm buildings and their adaptation into a holiday home and tourist accommodation. It echoes the concerns of the critical revision of modern architecture in the Portuguese context, distinctive by a creative reinterpretation of tradition: modern principles are introduced while continuing with vernacular construction techniques and materials. This early Álvaro Siza intervention in a rural context has become a reference case-study for other School of Porto architects (such has Fernando Távora, Eduardo Souto de Moura, among others) providing lessons, on how to reconcile the legacy of the past with the contemporary needs.

Under the framework of the project *Siza ATLAS; Filling the gaps for World Heritage,* funded by the Portuguese Foundation for Science and Technology (2021-2024), a comprehensive documentation of Siza's works included on the World Heritage Tentative List in 2017 is being implemented. Documentation methodology includes: a) literature review and archival research; b) interviews to building actors (architect, engineer, client and contractor); c) field work including observation, manual drawing and photographic campaign; d) digital documentation combining different tools: d1) photogrammetry model; d2) virtual tours through 360º photos; d3) didactic models of representative construction sections in BIM.

Detailed documentation of Alcino Cardoso house has allowed to identify remarks on best practices regarding renovation on vernacular heritage: by understanding the place before intervening and by preserving the lessons of traditional constructions (harmonious relation with the place, use of local materials and craftsmanship, preservation of natural and built elements) while providing these rural dwellings, with contemporary uses, compatible with their preservation.
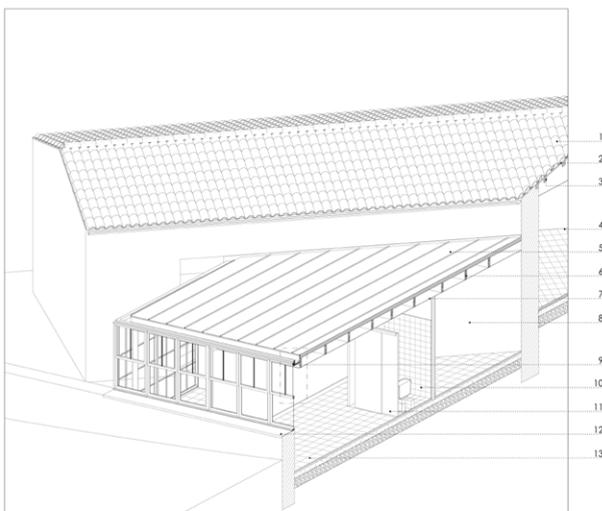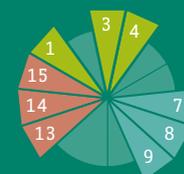
TOOLKIT FOR INNOVATIVE AND ECO-SUSTAINABLE RENOVATION PROCESS

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Università degli Studi di Firenze, Florence, Italy

WEBSITE
medbexlive.org/storyboard-of-university-building-stock/

USERS
Public Administration, building / energy managers, students, researchers,

VERSUS SUSTAINABILITY PRINCIPLES
2. Taking benefit from natural and climatic resources
3. Reducing pollution
4. Ensuring environmental comfort and well being
7. Transmitting and sharing building cultures
8. Encouraging creativity
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

The *Toolkit for Innovative and Eco-sustainable Renovation Processes* (Toolkit) is an easy-to-use guide to innovate the complex renovation process of the Mediterranean university/public built heritage using information, procedures, tools and tips to create sustainable and beautiful future buildings.

The project promotes the idea that renovation needs to further energy efficiency, looking towards the concepts of beauty, nature, and human comfort, together with the adoption of soft digital technologies, such as BIM methodologies. Those aspects are drivers to achieve common objectives of more sustainable university/public buildings, not only in terms of energy efficiency and the reduction of the environmental impact, but also in terms of well-being and aesthetics, as well as of an increased environmental awareness of users.

The Toolkit is designed to explain, step by step, how to approach retrofitting as an innovative process built around the role of people to boost inclusive and collaborative approaches. To open renovation actions by decision makers, stakeholders and users to the entire university, local, and global communities, the Toolkit is based on the adoption of the Living Lab (LL) methodology.

After the setting up of the university LL, the renovation process identifies five sequential phases: 1. Knowledge Framework, 2. Analysis of Criticalities, 3. Planning and Design, 4. Intervention and 5. Post-Management. Each phase investigates the activities to be undertaken (what), the people involved (who), and the methodologies and tools for implementation (how).

Furthermore, two sessions run parallel to the progression of the renovation phases: the Digital Twin Best Path - on the digital possibilities to innovate the renovation process; and the beXLab Experience - on the Toolkit application in the real-case pilot renovation action at the School of Architecture of the University of Florence.

The central part of *Planning and Design* has been enhanced with two supporting resources: a selection of best practices related to recently renovated and newly constructed university buildings which have adopted energy efficiency solutions and an abacus of retrofit solutions to guide the choice of the most appropriate renovation strategies, technologies and materials for the Mediterranean socio-climatic area.

The Toolkit has been produced in the framework of the *Med-EcoSuRe project – Mediterranean University as Catalyst of Eco-Sustainable Renovation*, financed by the ENI CBC MED Basin Programme 2016-2020.

➔
Box composed by the *Toolkit*, the *Abacus* and the *Best practices*
Four examples of the internal pages of the *Toolkit*
(credits: BeXLab, UNIFI)

RENOVATION OF A STONE AND RAMMED EARTH HOUSE IN VAL DI CHIANA, TUSCANY (IT)

Elena Rigano

Studio Architeco. Architettura ecologica, Italy

The building is part of a complex whose central core has a square perimeter that is divided into 4 parts, presumably dating back to mediaeval times, which stands two storeys above-ground supported by rammed earth walls without foundations.

The original usage included stables for Chianina cows on the ground floor, barns with 2 underground cisterns, and other agricultural storage spaces which were used until the Eighties. A series of extensions in masonry during the 19th-century contributed to the modification of the perimeter and volume of the building, including the addition of a third floor.

The main dwelling, which had a barrel-vaulted ceiling, was on the first floor, accessible by way of a staircase in travertine stone that connected it to the kitchen. It had a large central fireplace in the rammed-earth wall and around it the bedrooms. A bathroom was added in the Sixties. A second dwelling for the farmers was also located on the first floor, at the western corner of the building.

A terrible modernisation process undertaken during the Sixties demolished most of the brick vaults in the original earthen portion, as well as the 19th-century wooden floors, replacing them with concrete and masonry structures. The existing roofs are also from this period.

The intervention involved major seismic consolidation procedures and the energy upgrading of the entire building, both carried out following green building criteria. The opportunity of using the 110% tax super-bonuses made it possible to underpin the foundations with a brick structure, as well as construct an aerated crawl space and an insulated floor on the ground floor. Today the house has a class A energy rating, with a heat pump air conditioning system powered by thermal and photovoltaic solar energy: the radiant floor system is clad in handmade Tuscan terracotta tiles. The volume at the west corner of the building has also been seismically consolidated with reinforced plaster and given a hemp-based external insulation. On the ground floor, the walls surrounding the main body of the house have a thick coat of hemp lime thermo-plaster.

Special attention was given to the preservation of raw earth masonry: parts of it, once the cement was removed, remained exposed; others which were coated with lime have retained all the deformations that result from the wear and tear over the centuries, whereas those already enclosed in the brickwork, plastered and painted with 19th and 20th century decorations, after an adequate indenting, have remained as they were or were given an additional lime plastering. The wall that runs alongside the staircase down to the cellar, thought by some to be of Lombard workmanship, has been left exposed.
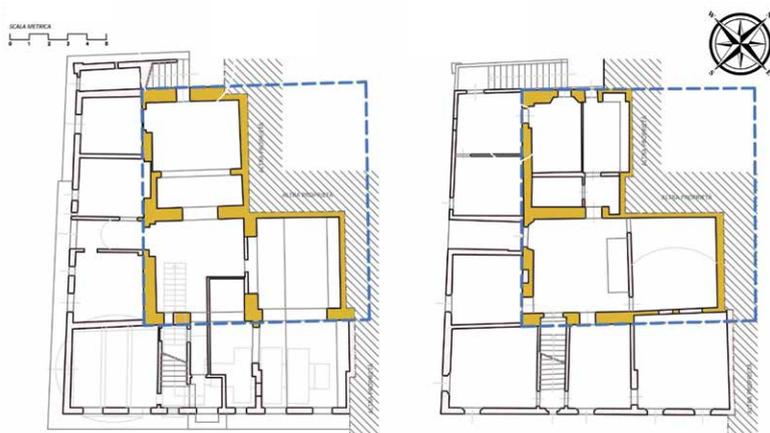
VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
2. Taking benefit from natural and climatic resources
3. Reducing environmental impact
4. Ensuring environmental comfort and well being
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
9. Recognising intangible values
12. Promoting local activities
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources
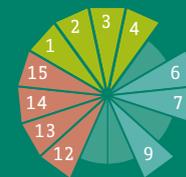
Plans of the ground floor and the first floor before the interventions
Photo of the retrofitted building
(credits: E. Rigano)

MEMORY GARDEN IN VINAROZ, CASTELLÓN (ES)

Fernando Vegas, Camilla Mileto
Universitat Politècnica de València, Valencia, Spain

ARCHITECTS
Fernando Vegas and Camilla Mileto

QUANTITY SURVEYOR
Salvador Tomás Márquez

PROMOTERS
Fernando Vegas and Camilla Mileto

VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
3. Reducing pollution
6. Encouraging social cohesion
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
13. Optimising construction efforts
15. Saving resources

➔
The project enhanced the use of local materials and recovered rubble for new elements, as well as the integration of nature
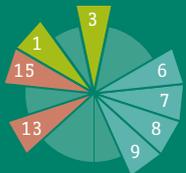
The arrangement of the dry stone walls follows the shape of the former convent

(credits: F. Vegas, C. Mileto)

The site where this garden stands was occupied until the beginning of the 21st century by a Franciscan Convent, founded in 1653, which was later used as a prison and a hospital. The structure was unexpectedly demolished as a result of real estate speculation with the help of a legal loophole that had left the monastery unprotected. After the scandal that was caused by the demolition, construction was prohibited on the site, which was then asphalted and used first as an improvised car park and finally, twenty years later, as a public green space. The project consisted in the excavation of the existing remains under the provisional asphalt and their re-use for the purpose of evoking the lost convent, raising its main walls to be used as benches. This upcycling action, which re-uses debris and other building materials recovered from the demolition of the convent with the traditional dry stone technique, very common in the area, also prevents the generation of waste, serves as an admonition against similar demolition actions, and turns a tragic and malicious action into something creative and inspiring instead. During the construction of the walls using old materials and recovered rubble, the masons who had good knowledge of the dry stone construction technique were given creative freedom, following some basic rules regarding the use of good bonding and the absence of forced symmetries. The project also contemplated the restoration of the only remaining wall of the church, which was in ruins. Likewise, the historical paving of the convent has been recovered, the remaining ruined wall of the original church has been consolidated and local plant species have been included in the landscaping of the garden. Senia stone, extracted from nearby quarries, was used for the new paving, which has been placed in such a way as to allow grass to grow between the joints. The grass-covered areas combined with the remains of the convent offer the image of a romantic ruin in symbiosis with nature, which the local inhabitants have learned to appreciate and enjoy, despite the initial loss of the original religious convent.

RENOVATION, SEISMIC AND ENERGY RETROFIT OF A FARMHOUSE IN TUSCANY (IT)

Sara Bartolini
Officina Abitare, Italy

The project involved the complete renovation of a large farmhouse that had been abandoned for years. The complex structure of the building required an in-depth preliminary study, aimed at reconstructing the history of the building, as well as the alterations it had undergone over time. In order to deepen this study, all the internal plaster and exposed the masonry have been we completely removed. This operation made it possible to read and detect in detail all the masonry textures and to plan the adequate seismic improvement and internal distribution interventions. This work of philological analysis lied at the basis of the project that concerned the reorganisation of the interior spaces, as well as the recovery of the relationship with the exterior spaces, in particular with the large farmyard. In this way, some walls of the house were identified where the masonry could be left exposed, thus enhancing the natural stone textures even within the interior spaces. The walls were sandblasted, subjected to localised *cuci e scuci* interventions so as to improve their stability, and then grouted with natural lime plaster. The floor finishes were selected, giving priority to traditional, natural, and locally-sourced materials, using modern laying patterns and formats, which together with the exposed steel reinforcement rings emphasise the contemporary nature of the intervention. The entire north side of the house, represented by a separate building structure, was internally insulated using certified lime silicate panels for bioarchitecture. In addition to protecting against the cold, this material also has high hygroscopic properties and helps to naturally regulate internal humidity. The plasters are hand-made, using thermal lime and hemp mortars. In order to ensure the maximum breathability of the walls, paints made from lime putty coloured with natural pigments were used.

Furthermore, to protect the ceilings from wood-damaging pests, they were treated with a mixture of neem and orange essential oils. These interventions for improving the energy efficiency of the envelope, as well as the installation of a heat pump system powered by photovoltaic panels, have made it possible to have a building with a historical appearance which, however, has the efficiency of a contemporary building; after the interventionthe building has been categorised as energy class B.

House and courtyard (*aia*) after the interventions
Renovation site during the installation of the lime silicate panels (2021)
(credits: Matteo Pierattini)

DESIGNING WITH TRADITION: OLD TECHNIQUES FOR MODERN ARCHITECTURE

José Luis Baró, Fernando Vegas, Camilla Mileto
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The Modern Movement in architecture, and subsequently the whole of the 20th century, represented an abrupt break with the historic evolution of traditional constructive techniques, which were shunned in favour of industrial materials such as concrete and steel structures. The reasons for this include a disdain towards vernacular architecture, possibly linked to the rural exodus and the more recent phenomenon of globalisation. In fact, in *History and Truth* (1965), Paul Ricoeur pointed out how "the phenomenon of universalisation… constitutes a sort of subtle destruction (…) of the creative nucleus of great cultures".

The Modern Movement specifically boasted its discredit of anything relating to history and tradition. However, even the master architects themselves kept some aspects of construction legacy alive: Le Corbusier (1887-1965) proposed rammed earth walls for his Murondin houses (1940); Josep Lluís Sert (1902-1983) and Le Corbusier featured tile vaults in some of their dwellings; Alvar Aalto (1898-1976) used timber, characteristic of traditional Finnish culture, and in his youth Walter Gropius (1883-1969) even defended the value of timber over any other building material; Ludwig Mies van der Rohe (1886-1969) used constructions with handmade rough fired brick and Alvar Aalto employed traditional red brick; Gunnar Asplund (1885-1940) and Frank Lloyd Wright (1867-1959) even used shingles for roofs and built underground constructions covered with sod; and Antonin Raymond (1888-1976) resorted to traditional straw roofs; etc. In all these cases, despite the disruptive theories of the Modern Movement, issues linked to the scarcity of the war and post-war periods and the personal aesthetics of the architects in relation to traditional materials and the manual nature of traditional techniques meant that these were also incorporated.

The second half of the 20th century also reflected examples which strayed from the main trend of using modern industrial materials. These were often observed in developing countries with a heterodox vision of modernity which Frampton once defined as critical regionalism. The aim was to make use of the advantages and, almost certainly, the aesthetics of traditional materials in combination with modern materials without having to give up the semblance of renovation. In India, two representative examples of this trend are found in the Gandhi Memorial Museum in Ahmedabad (1963) by Charles Correa (1930-2015), combining reinforced concrete frameworks with brick buttresses and a sloping roof of timber and ceramic tiles in an eminently modern building, while the Sangath studio (1981) by Balkrishna Doshi (1927-2023) features reinforced concrete vaults with alternative hollow tiles, covered with *trencadís*.

Timber construction used by the architects Alvar Aalto and Aino Aalto at Villa Mairea (1937-1939) in Noormarkku (Finland)

Detail of the wooden shingles used by Gunnar Asplund to build the roof of the Woodland Chapel (1918-1920) at the Stockholm cemetery (Sweden)

(credits: F. Vegas, C. Mileto)

opposite page
Compressed Earth Blocks (CEBs) being used by the architect Francis Kéré to build his Opera Village (2010). Laongo ,Burkina Faso

Experimental rammed earth walls mixed with salvaged tiles designed by Wang Shu for the Venice Biennale (2016)

Façade with brise-soleil of hanging traditional roof tiles at the Folk Art Museum of the China Academy of Arts (2015) designed and built by Kengo Kuma & Associates

*(credits: F. Vegas, C. Mileto)*
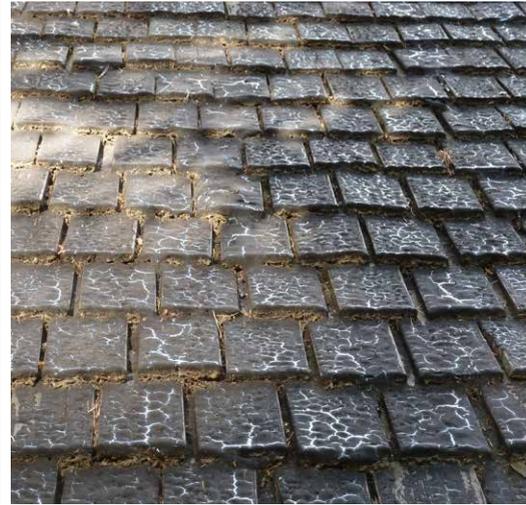
Other traditional techniques employed by architects and engineers resulted in major advances in terms of quality when combined with modern materials such as cement or iron. This is the case for example of tile vaults, which following notable contributions from Rafael Guastavino (1842-1908), Antonio Gaudí (1852-1926) and other Art Nouveau architects, were employed by an entire generation of modern architects during the Spanish post-war period, answering the need stemming from the Spanish autarchy period, most notably Luis Moya Blanco (1904-1990). However, it was also reinterpreted incorporating reinforcements, already proposed by Guastavino, in the construction of some works by Eduardo Torroja Miret (1899-1961); or even prestressing the said reinforcements in the design of the daring walls and roofs by Uruguayan architect Eladio Dieste (1917-2000).

The second half of the 20th century also brought with it the work of several pioneering architects who followed postulates related to the scarce availability of resources in the surroundings and the will to overcome this. They thus resorted to vernacular techniques as the most logical and inexpensive response to settings, preceding the current trend of sustainability, even before the term was coined. This is the case of the Egyptian Hassan Fathy (1900-1989), who recovered the ancient constructive technique of Nubian vaults, the English architect Laurie Baker (1917-2007), with extensive work in India handmade bricks, or the Mexican Óscar Hagerman (1936-2021), whose work empathises with the surroundings and traditions and "provides people with dignity while rescuing their cultural values with a sense of solidarity and democracy" (Alcocer, 2017).

This new awareness of problems due to pollution, CO_2 concentration in the environment and global warming appeared in part following the Seventies oil crisis. It was highlighted by the increased awareness resulting from the Kyoto Protocol (1997) and especially following the economic crisis of the early 21st century, bringing about a new type of approach which has partly dimmed the phenomenon of star architects and their star designs to give way to a different type of architecture.

Priority is now being given to architects who search post-catastrophe emergency solutions using
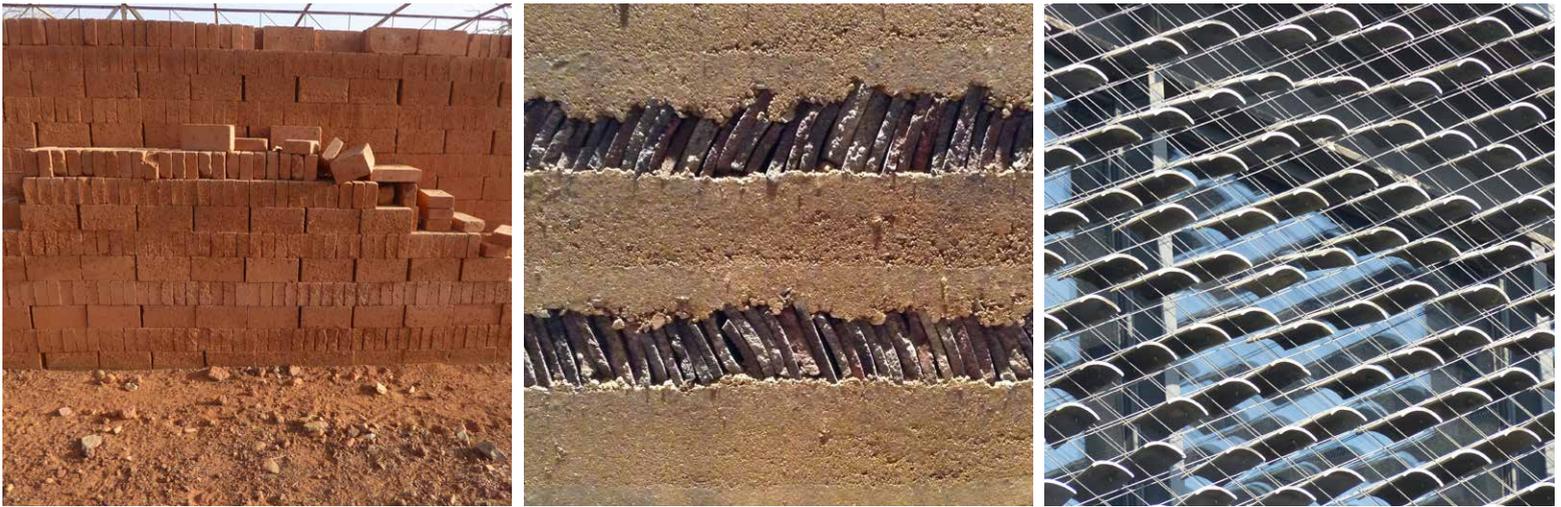
natural, local, recycled or improvised materials, such as Shigeru Ban. Or other architects, like Anna Heringer (1977), whose entire professional career is centred on cooperation architecture in countries with limited resources. Or also architects from impoverished areas who devote all their energy to the construction of public buildings using traditional materials and techniques in their countries of origin, as is the case of Francis Kére (1965) in Burkina Faso. Furthermore, architects like Peter Rich (1945) for example, work in the African continent, focusing on the use of tile vaults with compressed earth blocks in order to counteract the scarcity of timber and limited resources. Moreover, architects such as Anupama Kundoo (1967), who experiment with hybrid techniques, either building false domes in adobe bricks which are baked in-situ using an internal fire to produce a monolithic ceramic building, or vaults built with hollow terracotta tubes. Or even artisans who have made earth their dogma and main constructive material, as in the case of Martin Rauch, both in his individual work and in his collaborations with other architects.

Behind these star architects are numerous lesser-known architects producing a 0 km bioclimatic architecture using local materials and resources, promoting responsible consumption and especially considering life cycle analysis. Nowadays, working with timber, earth, stone, lime, gypsum or straw, characteristic of vernacular constructive tradition, has ceased to be an eccentricity to become a perfectly reasonable option.

Even architects who have received Pritzker awards resort to traditional materials and techniques for their work, either due to conviction or cosmetic sustainability. To quote the example of a traditionally maligned material and technique, architects including Norman Foster (1935), Glenn Murcutt (1936), Renzo Piano (1937), Peter Zumthor (1943), Herzog & De Meuron (both 1950), Wang Shu (1963) and of course, Francis Kéré, have used walls in rammed earth or compressed earth blocks in their work in the 21st century. Highly perceptive architects such as Kengo Kuma (1954) often resort to the use of traditional materials (timber, bamboo, tiles, stone, straw, etc.) for aesthetic and /or ecological reasons (Jodidio, 2021).

➡
Dar Al-Islam Mosque (1981-1982) in Abiquiú, New Mexico, (USA) designed by Hassan Fathy
(credits: F. Vegas, C. Mileto)
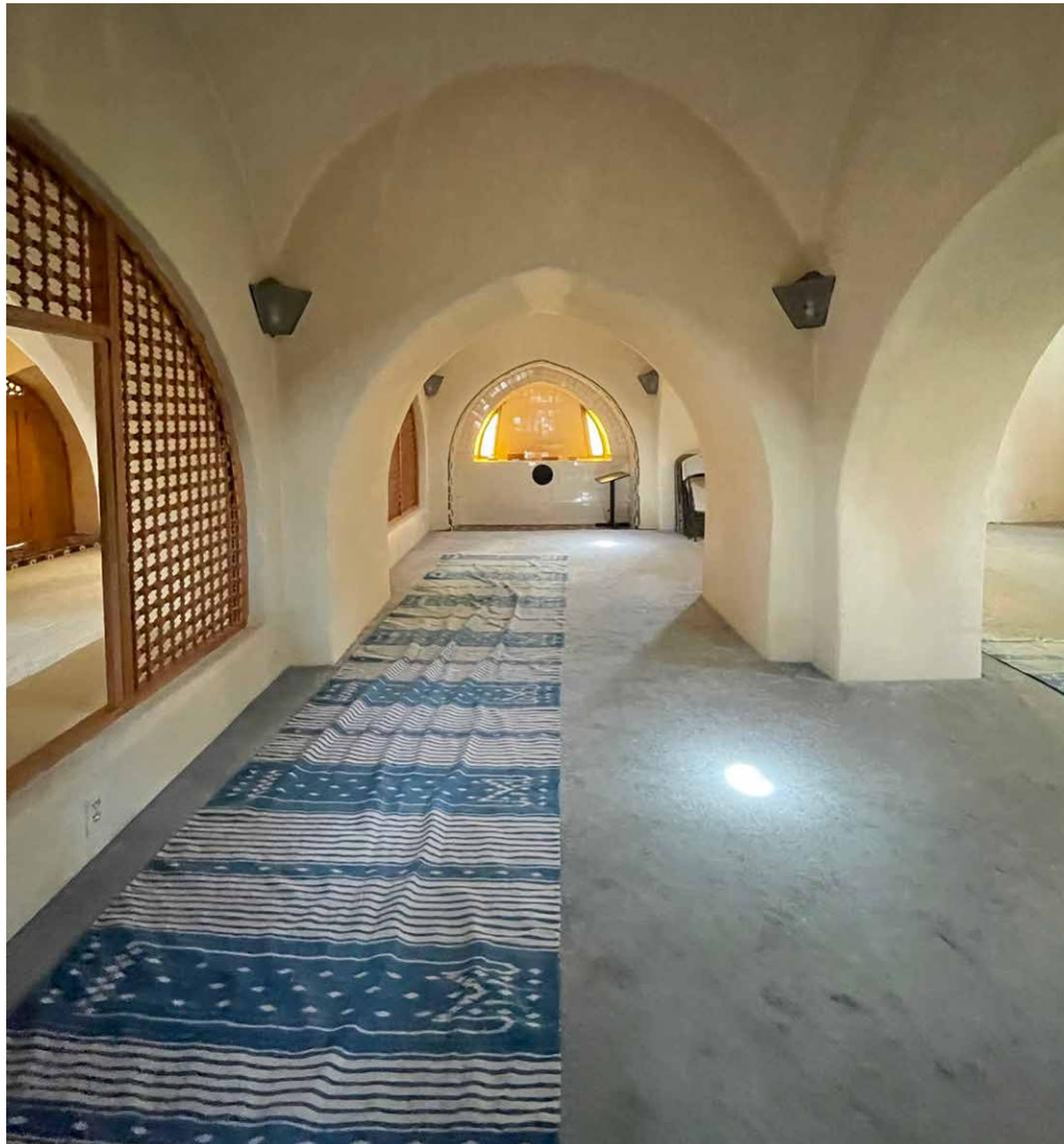
Many of these architects have resorted not only to traditional materials and techniques, but also to the systems or mechanisms of vernacular culture which improve dampness and temperature conditions inside buildings. This is the case of Hassan Fathy and his wind towers which generate a gradient of pressure by spontaneously expelling the hotter air and cooling the habitable spaces of homes during the warmer hours; Laurie Baker's use of lattices to act as filters to provide natural ventilation; or Francis Kéré and his use of double roofs, wide eaves, cross ventilation and skylights.

Conclusions

Traditional architecture is the result of the evolution of the constructive know-how of generations and generations which have tried to take full advantage of the available resources, based on local conditions and influences received, employing criteria of simplicity, durability and efficiency, and condensed by the aesthetic sensibility of individual peoples.

It is apparent that architecture continues to evolve, with constant advances implemented daily to improve human habitats. However, closing the door to tradition means jettisoning a valuable legacy, potentially (and paradoxically) constituting a step backwards. Furthermore, in a situation in which the long-term survival of the planet is not guaranteed, renouncing tradition is a luxury we cannot afford. This is about adding, not taking away. And nothing implies that this should be incompatible with modernity. There are many open paths. However, only a few technical ones have been mentioned here, including the reinterpretation and improvement of materials and techniques; the optimisation of resources and the promotion of local economies; and the respect for vernacular cultures and the continuity of skills.

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TILE VAULTING IN THE 21st CENTURY

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The tile vault is a building technique whose presence has been documented in Spain at least since the 14th century, although there are precedents in the context of Islamic building culture, as well as in the lost formwork of concrete vaults in Rome. It is a technique which allows covering vaulted spaces in a swift, inexpensive and efficient manner, and for this reason is still in use. A couple of token examples by the authors are presented. The first is a family mortuary chapel conceived as a homage to the local ceramic tradition and to the building technique in question. Moreover, the city of Vila-Real has the largest non-cathedral archpriestal church in Spain, constructed precisely with a tile vault by the master builder Juan José Nadal (1704-1762), who had a lot of influence over his great-great-grandson the architect Rafael Guastavino (1842-1908), famous constructor of tile vaults in both Barcelona and the United States. In this mortuary chapel, burials take place in a subterranean room under the vault, which is devised as a portico which shelters and encourages introspection and reflection in relatives and visitors to the cemetery. It consists of four interlinked hyperbolic paraboloids built with three layers of handmade ceramic tiles, the first one set with gypsum paste and the others with white cement mortar, without any intermediate reinforcement. The mausoleum's tile vault, derived from tradition, 12 metres wide and 6 metres high, with a total thickness of 8 cm, offers an exceptional lightness and permits economising materials, since it owes its resistance to its wavy shape and not to the accumulation of materials. The second example, built in collaboration with BRS and ODB in the context of their Beyond Bending Pavilion at the 2016 Venice Biennale, consisted in two small vaults with two layers of ceramic tiles and compressed earth blocks, the first set with plaster and cement mortar, and the second with plaster and a bastard mortar made of earth and cement. Both sail vaults were supported by metal frames which served as perimeter braces and had rows of small partition walls on their extrados of the same material as in the vault to establish the horizontal plane to step on. These vaults demonstrated to what extent this type of traditional solutions can be useful in contemporary architecture, thanks to their aesthetic qualities, functionality, affordability, economy of materials and low-carbon impact.

VERSUS SUSTAINABILITY PRINCIPLES

3. Reducing environmental impact
4. Ensuring environmental comfort and well being
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

➔
Mortuary chapel at Villarreal. Axonometric view

Beyond Bending Pavilion at the 2016 Venice Biennale

(credits: F. Vegas, C. Mileto)
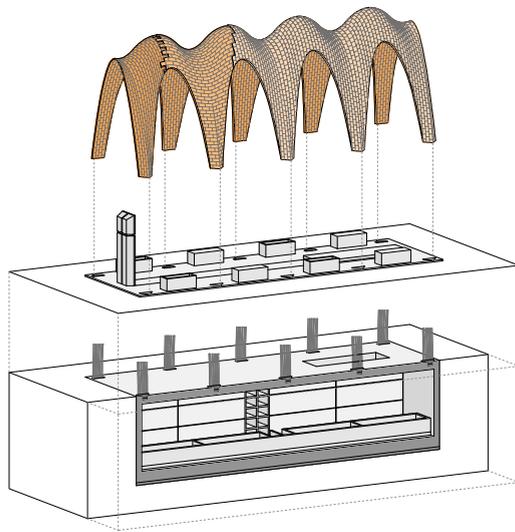
HOUSE OF NATURE, SILKEBORG HØJSKOLE BY REVÆRK (DK)

Birgitte Tanderup Eybye

Aarhus School of Architecture, Denmark

In recent years, many Danish studios have increasingly been involved in the design of buildings that draw inspiration from vernacular architecture. Examples include Studielandsbyen by Lenschouw Pihlmann, and Hahn Lavsen's own house. An exceptional example is the House of Nature by ReVærk. This building is designed to facilitate outdoor teaching at the Silkeborg Højskole, and the main users are around 40 young people at the outdoor course. Additionally, the building is also used by other students and for other activities at the folk school.

The House of Nature is situated in a meadow at the edge of the wood which is possible due to ground screw foundations. In this way, the building adapts to the landscape while also avoiding concrete foundations, which considerably reduces the environmental impact. The proximity to the forest has also influenced the choice of materials and thus the building is almost exclusively built of wood. Timber is used for the load-bearing construction and wood is used for floors and cladding, both in the exterior and the interior. Moreover, wood is also used for insulation. Consequently, the environmental impact of the building is very low.

The load-bearing construction takes its inspirational sources in the historic post-and-plank constructions that were common in Denmark. Instead of large planks fitted in between the posts, the exterior of House of Nature is clad with shingles which offers a more efficient use of the material. Two specific focuses in the design process were constructions open to diffusion, with the purpose of reducing heat loss, and the principle of design for disassembly. Regarding the latter, it is possible to take the components apart and reuse the timber and wood in new projects. ReVærk explains that they envisage their designs as an exchange of experiences between vernacular and contemporary building, including elements such as legislations and techniques. Their special focal points concern good indoor climate and low environmental impact.

The House of Nature is a prominent example of a current tendency in Danish building that is inspired in the translation and interpretation of vernacular heritage into contemporary, sustainable architecture.

ARCHITECTS
ReVærk architects

WEB LINKS
https://revaerk.dk/friluftshuset/
https://arkitektforeningen.dk/
nyheder/vaekstlagstegnestuen-
revaerk-baeredygtighed-er-en-
praemis/>

VERSUS SUSTAINABILITY PRINCIPLES
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12. Promoting local activities
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

Exterior view and interior view of the House of Nature

(*credits: Anders Rajendiram and ReVærk*)

SES MENORQUINES (ES)

Alicia Casals, Karl Nyqvist
Nomostudio, based in Barcelona, Madrid and Stockholm

WEBSITE
www.nomostudio.eu

CLIENT
Real-Estate Developer

COLLABORATORS
Building Engineer: Francesc Sbert; Structure Engineer: Ernesto Hermosa

PARTNER-IN-CHARGE & PROJECT LEADER
Alicia Casals

TEAM
Karl Johan Nyqvist, Mira Botseva

VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
2. Taking benefit from natural and climatic resources
4. Ensuring environmental comfort and well being
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values

➡
Photos of the completed project
(credits: NOMO STUDIO)

Ses Menorquines consists of a group of four summer villas overlooking the Mediterranean Sea from the north coast of Menorca island, Spain. Each house is slightly rotated in a fanned out setting in order to maximise the sea views and create privacy between them. The inspiration for the facades was taken from traditional vernacular architecture, with wholly whitewashed walls and pitched roofs. However, an interesting contrast is created by introducing contemporary elements such as large glased openings, sharp edges or flush, integrated furniture.

A well-organised and compact layout allows the fitting of 4 bedrooms and 3 bathrooms in 111 m^2. One of the main appeals of the houses, is their additional 46 m^2 of outdoor space, protected on its sides by perforated walls and covered by a double-height inclined roof. This day area is oriented towards the sea views and has a good overview of the common swimming pool in the plot's centre. To create a soft breeze through the porch and allow filtered natural light into this space, the gable walls of the villas were built up following a chess pattern that also ensures the necessary privacy towards the neighbouring houses.

The ground floor includes a guestroom, a small bathroom, a laundry room and an open kitchen, as well as the living and dining room. Three large sliding glased doors connect this open space with the covered terrace, all with stunning views over the sea. The windows on the ground floor go all the way down to the floor, with embedded rails, in order enhance the indoor-outdoor connection and increase the amount of natural light.

FAN FOREST HOUSES BY BERGMEISTERWOLF STUDIO (IT)

Matteo Zambelli

Università degli Studi di Firenze, Florence, Italy

The valleys of the Dolomites are dotted with barns. There is, in particular, one type of barn (which, depending on the geographical area, takes on different names) that consists of two volumes contrasting in construction system and materials. The first is the basement, a parallelepiped with a rectangular base tending to square, made of local stone, which, in addition to housing the cows and allowing other activities related to pastoralism to be carried out, had the function of raising the structure in elevation, made of wood with different construction systems, so as to avoid the deleterious effects of soil moisture and allow good ventilation. Commonly this second element was surrounded on two or three sides by a cantilevered "terrace" where hay was put to dry. The roofs of the barns were covered with *scandole*, that is, wooden boards 60 to 80 cm long. The slope of the roofs was very even among the different barns, because the slope of the pitches had to be such as to facilitate the sliding of snow without, however, dragging the shingles with it, but not too little slope, in order to avoid the stagnation of water and, consequently, the rotting of the shingles themselves.

The three vacation homes, part of a large hotel complex not far away, are arranged, as tradition dictates, not in parallel, but following the contour lines of the slope on which they lie. Their volumes are set consistently with the typological reference, although the building systems are actualized with respect to contemporary technologies. The basement in this case consists of two reinforced concrete walls, and it does not house any function. Its task is to support and lift the volume resting on it. Still in keeping with tradition, the latter is built with a wooden construction system, in this case using the contemporary technology of x-lam load-bearing partitions, i.e., laminated solid wood panels. The elevation structure, including the roof, is completely clad in pretreated gray wood laths capable of giving the volume a morphological essentiality typical of contemporary architecture.

Thus, the whole project speaks of tradition, capable of rooting the project in the place, although translated with the construction technologies and plastic research of contemporaneity.

ARCHITECTS
Bergmeisterwolf

COLLABORATORS
Alessandro Battistella, Lorenzo Musio

LOCATION
Deutschnofen, Italy

WEB LINKS
https://www.bergmeisterwolf.it/it/projekt/casa-sullalbero/

VERSUS SUSTAINABILITY PRINCIPLES
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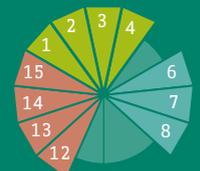
View and interior view of the Fan Forest houses
(*credits: Gustav Willeit*)

1
CONSERVATION AND DESIGN

Strategies for the management and dissemination of traditional knowledge for a sustainable future

4
KNOWLEDGE MANAGEMENT AND DISSEMINATION

2
EDUCATION STRATEGIES

3
COMMUNITY ENGAGEMENT

TEACHING ARCHITECTURE AND HERITAGE TO KIDS

AN OVERVIEW OF UNIVERSITY AND POST-UNIVERSITY EDUCATION IN VERNACULAR ARCHITECTURE

TRAINING WITH CRAFTSPEOPLE AND MAINTENANCE OF TRADITIONAL KNOWLEDGE

EDUCATION STRATEGIES

Sebastien Moriset
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The safeguarding of vernacular heritage and the transfer of the intelligences that gave rise to it are complex issues to resolve. In addition to financial aid packages and legal protection measures, promotion and education are indispensable tools to ensure the safeguarding of this precious heritage. But who to educate and in what form? The answer must be multiple. The owners of vernacular houses must first of all be made aware of the values of their property and educated about the existence of good practices. If out of ignorance they do not see the need to respect the values of their heritage, they will not see the need to call on competent professionals. Owners are therefore one of the first audiences to be targeted in order to encourage them to take care of their property in the framework of clear landscape charters and regulatory systems. But they are not the only ones. It is the whole chain of actors who must share the same knowledge and sensitivities so that the heritage resists irretrievable alterations. Forums for exchange such as public meetings or festivals sometimes allow connections between these stakeholders who together must build this awareness on heritage values. We recall here the main levels of training that an education strategy should include.

Education of local government decision-makers and technicians
In a single geographical area of Europe subject to the same heritage rules, we sometimes notice great disparities from one municipality to another. The safeguarding of heritage and the application of regulations depend largely on the skills of the civil servants and local councillors responsible for their implementation. These staff are waiting for knowledge to better guide conservation or development policies, based on local heritage assets. In the absence of training by heritage professionals, bad practices end up imposing themselves and becoming the norm. Training adapted to their role is therefore essential as they are the custodians of good practice. If they do not master the broad spectrum of heritage values, they will not hesitate to authorise inappropriate destruction or transformation.

Education of house owners
Homeowners are the primary decision-makers for alterations and are also the ones responsible for destruction. Old buildings rarely meet contemporary needs for large spaces, light and thermal insulation. Transformations are therefore inevitable and the orientation of owners is essential so that their

opposite page
Training of homeowners on conservation techniques
(credits: N. Sánchez)

rehabilitation projects respect the architectural charters and suitable building materials, particularly for all parts of buildings visible from the public domain. This education of owners can take different forms such as regular information days but also the distribution of highly illustrated documents explaining in a very clear way the regulations in force.

Education of kids

The education of children is extensively illustrated in this book and detailed in the next chapter. The future generations need to be made aware from an early age of the values of heritage and the options for quality interventions. It takes years of learning to appreciate heritage in all its richness and complexity, hence the importance of starting as early as possible. In societies where vernacular architecture is still practised, children are naturally integrated into building and maintenance practices. They do not wait until adulthood to learn about construction. Education of children is possible at multiple levels: physical interventions, observation walks, taking possession of sites, etc.

Education of craftpeople and building technicians

Good practices for safeguarding heritage are forged through hands-on experience over long careers on the building site. Young craftspeople do not have this cumulative knowledge to do quality work. The transfer of knowledge is a pillar of the transmission of vernacular knowledge and the initiation from master to apprentice was once a matter of course. This intergenerational transfer is still practised in many villages in Africa and allows young people to learn pottery or decorative plaster

techniques from their grandparents. This mode of transfer has been lost in Europe and must be revitalised, particularly on workcamps where the transfer of knowledge is done by gesture and experimentation. Working with the best people to document good practice through books and videos is also a good way to safeguard knowledge.

Education of architects and engineers

Architects and engineers are trained in the use of industrial materials and heavy forms of construction such as reinforced concrete structures. They are therefore disoriented when they come across an old building with serious pathologies. Due to a lack of knowledge, they will disguise the problems with unsuitable materials or simply raze the structure to the ground and rebuild it "identically", i.e. with the same volume and the same openings but using different materials. This lack of knowledge of vernacular buildings leads thousands of buildings to denaturation or simple ruin.

Education of building materials dealers

Finally, we should not forget the building materials retailers who often recommend the use of unhealthy ready-made industrial materials for old structures. Most of them think they are making good recommendations but they are wrong. It is therefore necessary to involve them in strategic meetings and training so that they adapt their advice and sell materials that are compatible with the heritage. The shift of these actors towards the sale of healthy materials is underway but awareness needs to continue.

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TEACHING ARCHITECTURE AND HERITAGE TO KIDS

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CRAterre, Grenoble, France

If we consider architecture in its playful dimension as a great 'construction game' that is constantly being renewed, there is no shortage of ideas for engaging children. Vernacular architecture can be seen as a great DIY epic developed by generations of geniuses who assembled and transformed raw materials and managed to surpass themselves over the centuries. As in children's construction games, vernacular architecture has the advantage of hiding nothing, it does not 'lie', it displays its materiality and its constructive sobriety. It is easy to understand the principles of construction in its broad outlines and to imagine how the craftsmen proceeded with the construction by simple visual observation. Most of the operations involved in vernacular construction can be reproduced on a small scale by children: forming balls of earth to stack them, tying up bits of wood, manipulating stones or adobe bricks of modest size, stuffing clay-straw daub into a formwork, etc. Creating, assembling, mixing, stacking or wetting fascinates children. One of the great advantages of vernacular architecture is that it uses healthy materials. Earth, stone, wood, straw and water are familiar, non-aggressive materials. They are mastered by most children who have had the pleasure of handling them by a lake or a river shore. It is always possible to get a slight injury by catching a splinter of wood in the finger or a pebble on the foot, but that is nothing like handling concrete or metal beams.

There are many possibilities for mobilising children and we give here some examples that have often been tried and tested and have proved their effectiveness.

Adopting a site to embrace heritage values

Children are regularly mentioned in discourses on heritage preservation. Heritage professionals like to say that they are conserving sites 'for future generations'. In reality, these future generations are already here before us, yet we rarely think of involving them. You do not have to wait until children are adults to make them aware of heritage. They are perfectly capable of understanding heritage values if we help them. One way to do this is to adopt a site. It can be an abandoned building, a park, a path along a river with some archaeological remains, the nature of the heritage is secondary. The idea in adopting a site is to create a bond of affection for the site by a group of children, usually a school class. Together with the teacher, the children can draw the place, express what they like or dislike about it, carry out clean-up campaigns to keep the site in the best possible condition, all punctuated by friendly outdoor picnics. In this way, they learn to take care of it and develop a new way of looking at a site whose interest

Old wooden house adopted by a group of kids in Røros, World Heritage Site, Norway

(credits: author)

opposite page
Kids playing with building materials at the *Grains d'Isère* festival, France

(credits: author)

would otherwise escape them. When the heritage allows it, it is also possible to integrate the children into conservation workcamps. But this requires the utmost caution and expert supervision to prevent any risk of accident.

Analysing heritage

Children can at a later stage participate in analysing the heritage they encounter on a daily basis. One of the exercises that can easily be carried out is analysis through observation and drawing. This exercise can be done in three thematic half-days. The first day consists of the children moving around the chosen place and drawing the elements that stimulate their senses in a positive way. They will draw places that they find beautiful, where they feel safe or where they can play, hide, buy good food, etc. The result is a wall of very positive drawings that is the result of the children's own reading of the site. This can be compared to what we adults call a heritage 'value statement'. The next day is similar but focuses on what they do not like. The result is another wall of drawings, but darker and much less joyful, where fears, ugliness and misunderstandings emerge. The last day is an opening for proposals with the idea of "how would you like this place to evolve positively for you and your own future children?". These exercises always lead to unexpected and highly relevant project proposals, some of which can then be implemented with the help of local authorities. It is important to remember that children have more time than adults to observe their environment and can therefore make valuable recommendations. It is advisable to have one or more heritage professionals accompany this exercise. They can help the teachers to prepare the visits well, for example by looking for old pictures of the places studied which will ease the analysis of the historical

evolution. They can also help to open up the kids' minds to cultural or natural heritage values that they would not have thought of. We also recommend that the exercises be carried out on sites that are familiar to the children, the historic centre of their town or village, the nearby countryside with its old houses, rather than taking them far away to visit a castle or a cathedral.

Understanding raw materials

Understanding a raw material can help children to master it, to understand how it reacts when it is worked with. Simple exercises such as those in the Elementerre kit described in this book can explain, for example, the components of earth and the role that water plays in its transformation. Similar exercises exist for wood and fibres. It is not essential to go through this scientific stage, but it speeds up the mastery of a material by revealing some secrets that are difficult to see with the naked eye.

Transforming raw materials into building components

Once the material is understood, it is then easier to work with it, by preparing clods of earth, moulding bricks, attaching bundles of straw or cutting branches to be used in construction. This step may seem daunting for children who could go straight to assembling elements prefabricated for them. However, it is an essential part of developing sustainable building skills. Earth is ideally suited to the self-production of building components. By realising that they can make bricks themselves rather than buying them, children are already taking a big step towards empowerment and resilience.

Assembling materials

Building a tree house in the forest is always a fabulous thing for a child to do. Many children love to build and when they are not in the forest, they assemble huts in their rooms with chairs, cardboard and bedsheets. Children's self-building of small structures is a gateway to the realities of the building site. They experiment, get hurt sometimes, shed a tear when everything collapses and then explode with joy when, with

patience, the structure is completed and finally holds. The adults must limit their guidance to the minimum to allow each child to understand for himself by making mistakes, by interacting with his friends, by seeing his piece of wall collapse before starting again. Children must be encouraged to become autonomous during these immersions in the world of construction and to acquire their own know-how.

Designing sites for children

The actions proposed above directly integrate the participation of children. However, it is also necessary to think of them when designing heritage promotion policies. Facilities, signage and activities must always take into account children's understanding, body size and aspirations, so that sites are useful and enjoyable for them. Information signs should be fun, well-illustrated and low enough to be seen by children. Heritage should be an opportunity to have fun and touch things. The remains of a medieval tower or an old locomotive that children can climb into are much more exciting than features that cannot be accessed. An archaeological site visitor centre can be very exciting for children if 'baby-excavation' areas are designed for them. They can then have a good time experiencing the excitement of uncovering items from the ground.

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EDUCATIONAL TRUNK IN SUPPORT OF TRADITIONAL ARCHITECTURE

Camilla Mileto, Fernando Vegas, Lidia García-Soriano, Valentina Cristini
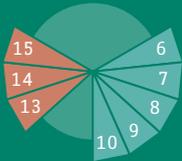Universitat Politècnica de València, Valencia, Spain

It consists in the design, development and implementation of an educational trunk in support of traditional architecture commissioned by the Cultural Heritage Institute of Spain (Instituto de Patrimonio Cultural de España) to the Universitat Politècnica de València. Its aim is to raise awareness among children concerning the value of traditional architecture and the need to preserve it, whether they inhabit it and do not appreciate it as a result of routine, or due to a false conception of modernity, or they observe it from the outside in their condition as urban inhabitants and are therefore not entirely capable of understanding and appreciating it to the full extent of its value in terms of culture and of identity. This trunk is designed exclusively for pre-school and elementary school levels, in other words for the ages of 2 to 10 years, since this is the time when experimental sciences are introduced into formal education. The work is divided into three parts: the introduction with its objectives and pedagogical methodology; the explanation of the contents of the educational trunk and the methodology of the exercises, the assessment and the educational units; and the development of activities concerning basic concepts, traditional architecture, materials and techniques, building elements, the surrounding context, the place and the ways of life. It offers a resource that will help teachers gain in-depth knowledge of traditional architecture as a fundamental part of the culture of a territory so that they can then transmit these ideas to their students. The proposed activities are aimed at bringing traditional architecture, understood as built heritage, closer to children in an experimental, fun and visually attractive way. The trunk was created with the aim of promoting awareness and knowledge of the tangible and intangible values of our traditional architectural heritage. The educational trunk makes it possible to study traditional architecture, its features and related topics from an interdisciplinary perspective. The trunk, which is freely available on the website of the Ministry of Culture to any teacher or interested individual, has been implemented on several occasions in pilot form with educators who in turn have been able to put it into practice in their schools.

WEB LINK

www.culturaydeporte.gob.es/planes-nacionales/dam/jcr:e09e72b3-e55f-4db6-ad61-143200a87dd9/2016-maleta-educativa.pdf

USERS

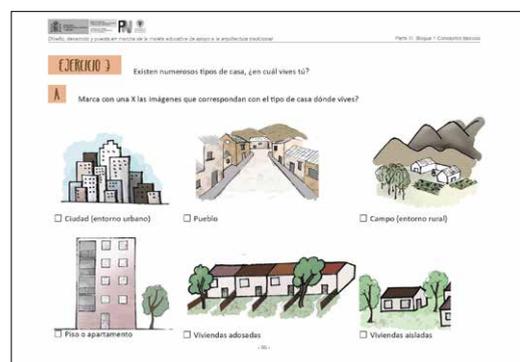Children between 2-10 years old

VERSUS SUSTAINABILITY PRINCIPLES

6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

➜
Extracts from the educational trunk

REHABIMED KIDS: WORKSHOPS ON TRADITIONAL ARCHITECTURE

Letizia Dipasquale, Università degli Studi di Firenze, Florence, Italy

Montserrat Villaverde, Ramon Llull University, Barcelona, Spain

The Rehabimed kids workshops on traditional architecture are aimed at the active involvement of children in the process of discovering, knowing and understanding traditional heritage and living places.
A set of pedagogical tools and activities have been developed for the first time in 6 cities of the Maghreb (Ghardaïa and Dellys in Algeria, Marrakech and Salé in Morocco, Sousse and Kairouan in Tunisia) in the framework of the project *Montada. Forum for the promotion of traditional architecture in the Maghreb*, funded by the Euromed Heritage 4 EU programme. The activities were designed with an approach based on the stimulation of creativity and individual perception of each child, in order to broaden the knowledge of traditional architecture not on the basis of the presumption of adults but understanding their current perceptions and their desires for change for the future.
The children were guided to carry out and redesign their habitats through different types of supports and materials (floor plans and 3D models in cardboard to be assembled, clay, fabrics, threads, colours of all kinds, collage, etc.), stimulating reflection and imagination on the present and future use of their dwellings. The learning process and the children's contributions to the chosen theme has been analysed to further develop workshop themes interactively, through online postcards and games, cut-outs and animated videos, as well as directly incorporating the views and perceptions of the participants.
The work carried out to set up pilot operations for recreational and pedagogical workshops about traditional Mediterranean architecture, creating academic material to develop them, represents the starting point for extending these workshops to other areas of the Mediterranean and for developing a methodology that can be used as a knowledge base. Play offers a means to discover traditional construction techniques, the specific finishes that give substance and specificity to historical urban landscapes, and to create and teach a specific vocabulary associated with architecture, among other aspects. The workshops also addressed the fusion and coexistence of age-old architecture and modernity; and the development of creativity in children and also in the educational community.
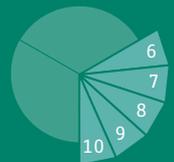
WEB LINK
www.rehabimed.net

USERS
Children

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
8. Encouraging creativity creativity
9. Recognising intangible values
10. Encouraging social cohesion

Rehabimed kids worskhop in Ghardaïa and Salé
(*credits: L.Dipasquale, M. Villaverde*)

PRACTICAL TOOLS FOR TEACHING ARCHITECTURE AND HERITAGE TO CHILDREN

Borut Juvanac
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Recognising and knowing vernacular architecture, with the help of documentation and scientific methodology, leads to understanding and appreciating it and its use today.

Knowledge transfer is complex; some inventions are understood and some are not. Some objects use physical phenomena although the builders did not really understand them – they just used inherited knowledge and their own skill.

Historically, knowledge was limited, only a few people had the opportunity to have a good education, but clever inventions and useful executions were created in traditional architecture, and proven by way of practical examples. We do not need shortcuts (such as rigid rules, superstitions or habits), but we have to understand and be familiar with all possible solutions, including those involving sustainability. A quality future cannot be achieved without the wisdom from the past and most inventions can be better understood with good knowledge of the practices of our forefathers – of course with the support of all the recent possibilities offered by technology, including digitalisation.

Vernacular architecture must be kept alive as important evidence of our culture, although only together with the local community and its social life, which is not and cannot become obsolete or irrelevant for our future.

Vernacular architecture still exists in a physical sense, although it cannot be built today exactly as in the past. Its essence exists and can be prolonged only with knowledge and understanding. Moreover, we have to continue its mission with current knowledge – not physically, but with its sense.

A paper template pack can be only a toy, but if it is used for constructing a real building with all its details it becomes more, it is education.

Magic boxes are more comprehensive; they need the activation of the brain and coordination of intelligence and practical skills.

Special importance has to be ascribed to archaeological assets, normally found as untouchable objects in museums. A drystone children's playground reveals all the details in practice, and an archaeological sandbox helps children also to understand hidden, invisible culture.

Childrens' toys, games and simplified tools can be an important aid to understanding our culture.

Only a well informed and stimulated community can know its culture, can appreciate it and be proud of it.

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
9. Recognising intangible values

7
9
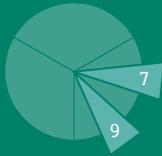
Cardboard template pack
It reveals 3D model from the plain technical drawings

Magic box
Made of four cubes and connected by a canvas can help to understand the cuts in all directions

Drystone children's playground and archaeological sandbox
They can easily develop children's imagination
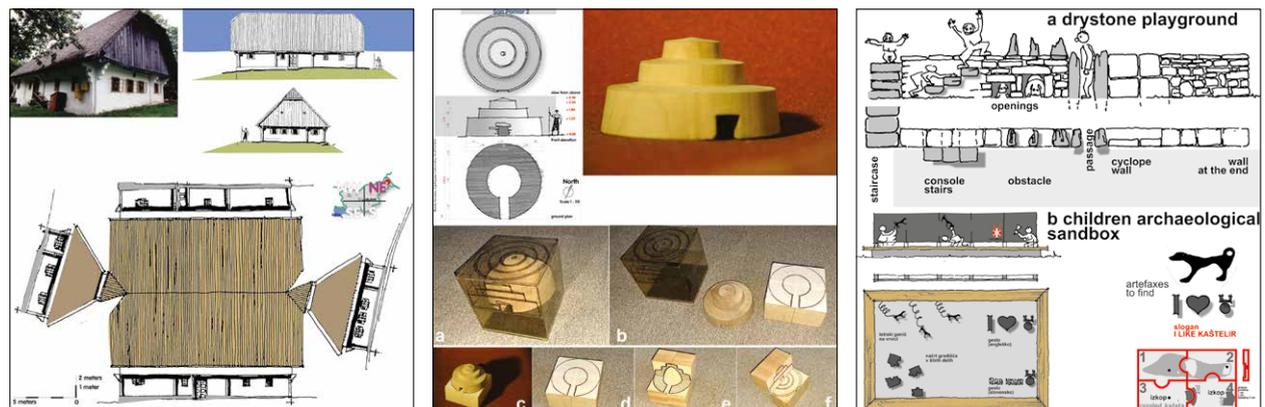
ELÉMENTERRE

Nathalie Sabatier, Alba Rivero Olmos
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Élémenterre is an educational kit developed by CRAterre to help students of architecture and engineering, construction professionals, as well as schoolchildren and the general public, adults and children, discover the properties of earth in order to understand why and how it is possible to build with raw earth. The design of the kit owes much to Patrice Doat, who based his teaching on experimentation, a real driving force for triggering imagination and encouraging creative thinking. The ÉlémenTerre kit plays on the pleasure of doing and experimenting.

This tool provides participants with intense moments of experimentation and discovery. Invited to carry out simple scientific experiments, they develop a direct, tactile, playful, surprising or spectacular relationship with the material earth and discover that earth, this so common yet so little known material, is made up of grains - pebbles, gravel, sand and clay - water and air. By combining them, a solid material is obtained that can be used to construct buildings and houses which can withstand centuries of use. This tool accompanies the participants from grain to architecture, allowing them to develop a new understanding of the earth material in order to be open to creation and innovation.

Élémenterre is presented in the form of 3 boxes of approximately 20 kg each. Their contents allow a series of playful experiments to be carried out. All the accessories in the boxes are deliberately familiar kitchen utensils that put the participant at ease. The course lasts approximately 90 minutes and is dynamic, with participants standing in small groups and encouraged to be active and reactive. They move from table to table, from experiment to experiment, following a precise path where each manipulation represents an idea, which in turn is linked to others so as to bring a new element to the understanding of a granular material or to the understanding of a reaction of one of its components. The educational itinerary is composed of four distinct parts: grains, air, water and forces. Participants go from touching the different grains that make up the earth to identifying them, then to highlighting the presence of air in a pile of earth, air that must be removed to obtain a more compact material, to the role of water, which acts as a glue and whose capillary rise must be controlled, to finish with the phenomena of blockages due to chains of force during compacting.

USERS
Students of architecture and engineering, construction professionals, schoolchildren, the general public

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
8. Encouraging creativity creativity
9. Recognising intangible values
10. Encouraging social cohesion

Elémenterre activities
(*credits: S. Moriset, Patrice Doat*)

LA MEDINA DI SEFROU
COMPRENDERE UN LESSICO COSTRUTTIVO

MORFOLOGIA ARCHITETTONICA

SISTEMI COSTRUTTIVI
MURATURE

SISTEMI COSTRUTTIVI
SOLAI

SISTEMI COSTRUTTIVI
APERTURE

CRITICITÀ
NEI SISTEMI
COSTRUTTIVI

LA MEDINA DI
SEFROU
COMPRENDERE UN LESSICO COSTRUTTIVO

AN OVERVIEW OF UNIVERSITY AND POST-UNIVERSITY EDUCATION IN VERNACULAR ARCHITECTURE

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An educational premise from VerSus & VerSus+

One of the premises advocated by the two European projects – *VerSus / Lessons from Vernacular Heritage to Sustainable Architecture* and *VerSus+ / Heritage for people* – is that vernacular heritage, both in its tangible and intangible components, can teach invaluable lessons and principles concerning sustainable architecture. Vernacular architecture is indeed a good example concerning sustainability, since it fully integrates cultural, social, and economical aspects, but especially constructive traditions while respecting the surrounding nature and habitat.

In order to reach the full potential of these lessons and assure vernacular heritage protection and survival in this fast-paced world, a strategy for its teaching and awareness is required. University training plays a central role in this outcome, since it can raise awareness for the values of vernacular architecture in the sustainable development of cities and communities. In this sense, this chapter will present a series of good practices of university education, associated with this important challenge.

A first approach surveying vernacular architecture

The research approach that was developed intended to address a first overview of the courses that teach vernacular architecture worldwide. The main aim was to identify which universities and educational levels currently have vernacular architecture, as part of their curriculum, especially in the field of architecture, but also history, geography, anthropology, among others. The method was structured sequentially, which means that a first approach was addressed through meta-analysis; and a second approach was developed through content analysis. The meta-analysis followed a literature review, study courses' descriptions review, and a survey.

Regarding the survey, all members of ICOMOS - CIAV | International Committee on Vernacular Architecture and of ICOMOS – ISCEAH | International Committee on Earthen Architectural Heritage were contacted. As a result, more than 30 responses were received. Individual responses were addressed, to identify the accuracy of the information. Following, a key search was undertaken on search engines using both 'vernacular architecture', 'vernacular architecture education', and 'vernacular architecture courses' as keywords. This was addressed in English, French, Portuguese, Spanish, and Italian. Information was considered in particular, regarding the last 10 years.

Following the analyses of the CIAV members' and ISCEAH members' responses, and after double-

CONTINENT	COUNTRY	UNIVERSITY	COMPULSORY SUBJECT
Europe	Austria	Vienna University of Technology	"Vernacular Architecture"
	Estonia	Estonian Academy of Art	"Studio"; "Craft Theory"; "Historical Materials and Conservation Techniques".
		Tartu University, Viljandi Academy of Culture	"Vernacular Expressions and Analytic Categories"
	France	Chaillot School, City of Architecture and Heritage	"Conservation and Restoration of Ancient Buildings"
	Germany	Brandenburg Technical University	"Study Project: Sustainability of Vernacular Architecture in Organically Evolving Cultural Landscapes"
	Ireland	Trinity College Dublin, Department of Civil, Structural & Environmental Engineering	"Advanced Building Repair"
		University College Dublin, School of Irish, Celtic Studies and Folklore	"Aspects of Ethnology"
		Irish Research Council & Carrig Conservation	"Energy Efficiency in Traditional & Heritage Buildings"
	Italy	University of Florence, School of Architecture	"Architecture, Materials, Environment" "Knowledge, preservation and structural safety of the built heritage"
	Norway	Oslo School of Architecture and Design	"Form Studio: Modular Vernacular"
		Norwegian University of Science and Technology	"The History of Western Architecture, 1400 to 2000"
		Bergen School of Architecture	"Vernacular History"; "Diploma Project: Inspired by Place – Why We Build"
	Portugal	University of Algarve, Faculty of Human and Social Sciences, Faculty of Sciences and Technology	"Cultural Landscape and Traditional Architecture" (optional); "Project and Cultural Landscape"; "Architecture and Heritage in the Mediterranean"
		Portucalense University, Department of Architecture and Multimedia Gallaecia	"Studio Design - Analysis"; "Materials and Constructive Analysis"; "History of Construction"; "Ecological and Sustainable Architecture and Urbanism"; "Diagnosis and Technology of Conservation and Restoration".
		University of Porto, Faculty of Humanities	"History of Vernacular Architecture"
	Romania	University Babes-Bolyai in Cluj-Napoca, Faculty of History and Philosophy	"The Vernacular Architecture and Rural Settlements in Central and Eastern Europe"
	Slovenia	Ljubljana University, Faculty of Architecture	"'Vernacular Architecture" (Optional)
	Spain	Universitat Politècnica de València, School of Architecture	"Restoration of Non-Monumental Architecture"; "Architectural Restoration"
	UK	University of Liverpool, School of Architecture	"Environmental Design 2"
		University of York, Department of Archaeology	"Building Conservation Projects"
Asia	Lebanon	American University of Beirut, School of Architecture and Design	"Architecture Design IV: Environmentally Responsive Architecture"
	Oman	Sultan Qaboos University, Department of Civil and Architectural Engineering	"History II: Islamic and Vernacular"; "Omani Vernacular Architecture"
	Turkey	Mimar Sinan Fine Arts University, Architecture Department	"Conservation of Vernacular Architectural Heritage"
Africa	Algeria	Polytechnic School of Architecture and Urban Planning	"Earth Architecture and Construction"
	Egypt	Cairo University (AAST), Department of Architectural Engineering and Environmental Design	"Vernacular Architecture in Egypt"; "Heritage and Architecture"
		Arab Academy for Science, Technology and Maritime Transport	"Vernacular Architecture"
		BUC "Badr University in Cairo", Department of Architecture	"Vernacular Architecture"
	Morocco	Euro Mediterranean University of Fez, Architecture School	"Mediterranean Vernacular Architecture"

America	Canada	Carleton University, School of Indigenous and Canadian Studies	"Heritage Conservation"
		Université Laval, FAAAD School of Architecture	"Vernacular Architecture"
		University of Guelph, School of History	"Rural Studies"
		Willow Bank School of Restoration Arts	"Heritage Conservation Diploma"
		University of Calgary, School of Architecture, Planning and Landscape	"Advanced Special Topics in Environmental Design"
	Chile	University of Chile, Department of Architecture	"Vernacular building techniques. From rural to sustainability"
		Pontifical Catholic University of Chile, School of Architecture	"Earthen construction: Tradition and innovation"
			"Architecture and Construction in Raw Earth: Multidisciplinary Analysis of a Traditional Material"
			"Indigenous Built Vernacular Heritage in Chile"
	Dominican Republic	Pontifical Catholic University 'Madre y Maestra', Faculty of Social Sciences, Humanities and Arts	"Vernacular and Popular Architecture"
		National University Pedro Henríquez Ureña, School of Architecture and Urbanism	"Vernacular and popular architecture in the Caribbean"
	Mexico	Mexico National Autonomous University	"Vernacular Architecture"
		Yucatán Autonomous University, Faculty of Architecture	"Mayan Culture"
	USA / Hawaii	Columbia University, Graduate School of Architecture, Planning and Preservation	Traditional Building Technology
		University of Colorado at Denver, Department of Architecture	"Regionalism(s) and the Vernacular"; "Special Topics Cultural: Architecture & Nature"
		University of Hawaii at Manoa, School of Architecture	"Vernacular Architecture"; "Hawaiian Indigenous Architecture"

checking the available data of the courses online in different languages, an overview table was created to structure the data in terms of country, university, name of the course. Then, a second table was created with information from published literature. A content analysis was undertaken to identify and cluster the similarities and contrasts between the content of the courses. This small sample was enough to give an overview, even if not definitive, since it aimed to be a starting point of reflection on the gaps and trends of education in vernacular architecture.

An overview of vernacular architecture courses worlwide

The *Charter of Built Vernacular Heritage* (ICOMOS, 1999), within its lines of action, advocates for educational hubs, such as universities, the responsibility to implement initiatives aimed at teaching the values of vernacular architecture, and as a result, raising awareness for its conservation. Based on this charter, one course of vernacular architecture in South America, justified the relevance of the course due to the fact that a third of Colombia's listed architectural heritage were totally or partially built on earthen traditional building techniques (Sánchez Gama, 2007).

Despite the importance of studying vernacular architecture, from the typological and constructive perspective, but also as an added value regarding the adaptation to climate change, vernacular architecture is rarely included in architecture higher education programs and degrees. In heritage conservation, this type of study is neglected and is considered a sub-theme or an optional subject.

| CONTINENT	COUNTRY	UNIVERSITY	COMPULSORY SUBJECT	OPTIONAL SUBJECT
Europe	Belgium	Catholic University of Louvain, Faculty of Architecture, Architectural Engineering and Urban Planning		"Vernacular Architecture"
	Cyprus	University of Cyprus, Department of Architecture	"Vernacular Architecture and Contemporary Issues"	
	France	Britanny National College of Architecture	"Design Studio Workshop: Landscape and Vernacular Architecture"	
		Lille National School of Architecture and Landscape	"Vernacular"	
		Paris-Belleville National School of Architecture of Paris-Belleville	"Living in the Contemporary Countryside"	
		Sorbonne University, Faculty of Arts and HUmanities		"Architecture, Environment, and Sustainable Development"
	Italy	University of Pisa, Department of Energy, Systems, Land and Construction Engineering	"Vernacular Architecture"	
	Sweden	Umeå School of Architecture		"Vernacular Architecture of the Nordic North"
	Serbia	Faculty of Architecture, University of Belgrade [Discontinued]	"Vernacular Architecture"	
	Spain	Polytechnic University of Madrid, Higher Technical School of Architecture of Madrid		"Popular Architecture from Lanzarote"
	Switzerland	Federal Institute of Technology in Lausanne, School of Architecture	"Alpine Architecture"	
Asia	China	Tsinghua University School of Architecture		"Traditional Houses and Vernacular Architecture"
		University of Hong Kong, Department of Architecture		"Design Research on Architecture and the Environment" and "Vernacular Architecture in Asia"
	India	Indian Institute of Technology Roorkee, Department of Architecture and Planning		"Vernacular Architecture"
	Indonesia	School of Architecture, Planning, and Policy Development, Institute of Technology Bandung		"Vernacular Architecture of Indonesia"
	Saudi Arabia	King Fahd University of Petroleum and Minerals, Architecture and City Design Department		"Special Topics in Regional Architecture"
	Sri Lanka	University of Moratuwa, Department of Architecture		"Measured Drawing of Devala Buildings"
North America	USA	North Carolina State University, School of Architecture		"Vernacular Architecture"
		Polytechnic University of Puerto Rico, School of Architecture	"Vernacular architecture at Puerto Rico and at the Hispanic Caribbean"	
		University of Florida, College of Design, Construction and Planning		"Vernacular Architecture and Sustainability"
		University of Illinois Urbana-Champaign, Department of Landscape Architecture		"American Vernacular Cultural Landscape"
		University of Wisconsin-Milwaukee, School of Architecture and Urban Planning		"American Vernacular Architecture"; "Vernacular Buildings and Groupings"
Central America	Haiti	University G.O.C., Department of Architecture	"Vernacular Architecture I"	

South America	Brazil	Luciano Feijão Faculty, Architecture and Urbanism		"Vernacular Architecture"
		Federal University of Pará, Faculty of Architecture and Urbanism		"Architecture of the Tropics"
	Colombia	La Gran Colombia University, Faculty of Architecture		"Introduction to Vernacular Architecture"
Africa	Algeria	Ferhat Abbas Setif University 1, Institute of Architecture and Earth Sciences	"Vernacular Architecture in Algeria"	
	Egypt	American University of Cairo, School of Sciences and Engineering	"Vernacular Architecture"	
	Senegal	University College of Architecture of Dakar	"Vernacular Architecture & Sustainable Construction"	
	Tunisia	University of Gafsa, Higher Institute of Arts and Crafts of Gafsa	"Vernacular Architecture"	
		Central Polytechnic Private School of Tunis	"Vernacular Architecture"	

Tables 1 and 2 show an overview of the courses on vernacular education, following the data collection phase, an online survey and a literature search, respectively. Table 3 shows the visualization of the overall courses taught by country. All universities and courses' names were translated to English.

Trends in terminology

Most of the degrees with vernacular architecture subjects/courses were found in Europe, Africa, and Asia, whilst regional architecture was identified in North, Central, and South America. In some cases, other terms were used interchangeably to refer to vernacular architecture, in spite of different meanings (Duarte Carlos et al, 2015). It was the case of popular architecture (Spain) (Barbero Barrera et al., 2012), old architecture (Serbia) (Roter Blagojević, Nikolić, 2019), traditional houses (China) (Porras Álvarez et al., 2016), traditional construction (Norway), traditional buildings (Ireland), popular architecture/ traditional architecture (Portugal) rural settlements (Romania), and rural and indigenous architecture (Mexico). More recent courses addressed contemporary issues such as sustainability (Cyprus) (Philokyprou, 2011), changes that are needed to adapt to social and climate constraints.

It is important to highlight the difference between vernacular architecture, traditional architecture, and popular architecture. Popular can be usually associated with poverty or modesty, but also with economic pragmatism, often it is self-built with precarious means (even modern materials) and without specific actors dedicated to the art of building. Traditional is a broader term and refers to a constructive tradition and empirical knowledge. It can have specialized actors subjected to scholarly influences, even without scientific training. Finally, Vernacular is a term that is closer to Regional architecture (not Regional Criticism) and to Autochthonous architecture. In vernacular architecture local techniques and local construction processes are used. By definition and according to Duarte Carlos et al (2015, p.14), "all Vernacular Architecture is always Traditional and it can encompass a component of Popular architecture". It is no longer associated with primitive building processes, more with local ways of building.

Most of the identified courses of vernacular architecture taught in Europe, Africa and Asia address the subject, as "Vernacular Architecture". This is the case for instance of Austria, China, Egypt, France, In-
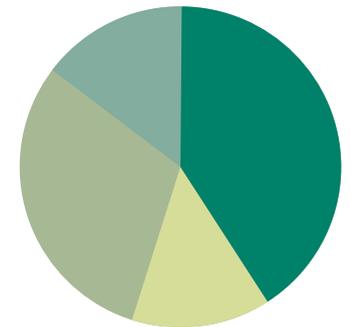
■ Europe: 41.7%
■ America: 31.9%
■ Africa: 13.9%
■ Asia: 12.5%

⬆

Chart showing the percentage of universities worldwide that have studies in vernacular education, according to this first overview conducted in 2023

opposite page
Information collected from the literature and search engines

(credits: authors)

dia, Indonesia, Oman, Portugal, Slovenia, Spain, and Sri Lanka (Gunewardene, 2016; Porras Alvaréz et al., 2016). In some universities, the courses are optional. Only a few of the courses are taught on a bachelor's level, as most are taught at a Master's level.

Furthermore, some of the courses add specific geographic and cultural contexts to their title, such as *The vernacular architecture and rural settlements in Central and Eastern Europe* (Romania), or *Design Research on Architecture and the Environment and Vernacular Architecture in Asia* (China). Other courses address vernacular through the lenses of sustainability (Germany), or through intangible heritage related to crafts (Norway). One example of this cluster is a course at the TUWIEN (Austria), which addresses vernacular architecture based on a selected object, to identify region-specific building typologies; understanding specific traditional building techniques; and critically reflect on methods of conservation. The course includes theory about tangible and intangible aspects of vernacular architecture, a visit to a museum, an on-site object documentation, and analysis of typologies, materials and constructions. In the USA, *Regionalisms and the Vernacular* (University of Colorado, Denver) is mandatory for historic preservation students, focusing on vernacular architecture, cultural landscapes, and regionalism through the lens of the built environment. In Brazil, at the Federal University of Pará, the specialization course *Architecture of the Tropics* (now discontinued) was created with a regionalist foundation. In both cases, USA and Brazil, the courses value the importance of the regional approach, regarding the architecture of the place. Kenneth Frampton's Critical Regionalism (Frampton, 1983) highlights critically the approach to modern architecture for its universal progressive qualities while valuing the geographical (topography, climate) and cultural (tectonic, typology) contexts. In this sense, critical regionalism in architecture differs from vernacular architecture in the sense of the production of new architecture which seeks to mediate the global (technological developments) and local (spatial-cultural) contexts.

Conclusion

This chapter intends to give an overview of university and post-university education in vernacular architecture, as a step towards the survival, the awareness and the need for protection of vernacular architecture. Several universities worldwide offer courses or include on their program's subjects related to vernacular and traditional architecture, specifically regarding heritage, methods, materials, and practices. On the one hand, some courses have been discontinued, on the other hand new courses are being taught combined with the sustainability subject together with climate change adaptation.

This was a first attempt to survey and give an overview of vernacular architecture in higher education. It is a limited research and it is not meant to be definitive. Still, it helped identify gaps and trends on education regarding vernacular architecture, such as the interchangeability of vernacular architecture with traditional architecture and popular architecture. This reveals the need to further advance on the *Charter of Built Vernacular Heritage* (ICOMOS, 1999), as further debate is needed on the etymology and terminology, but especially on the importance of vernacular architecture education in undergraduate

and graduate degrees, as they could be key to contribute for vernacular architecture protection and preservation.

Moreover, the conservation and the rehabilitation of vernacular architecture are becoming vital subjects, especially in a globalized world where they are fast disappearing. Leading and innovative Universities can play an important role towards vernacular architecture protection and survival. Especially if they involve undergraduate and graduate students through education and research. More than just providing awareness, universities can prepare future architects, engineers and conservators with fundamental tools to work in traditional settlements and assure the protection and continuation of their cultural significance.

Acknowledgements

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DSA: EARTHEN ARCHITECTURE, BUILDING CULTURES AND SUSTAINABLE DEVELOPMENT

### Bakonirina Rakotomamonjy
CRAterre, Grenoble, France

USERS
Post-master students
(engineers, architects,
archaeologists, historians,
sociologists, etc.)

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion

The building sector is responsible for 40% of the energy consumed in the world. Building professionals need to find alternatives to reduce this impact. Vernacular architecture and in particular earthen construction offers relevant answers to this environmental challenge. Indeed, earthen material is in many countries locally accessible, it requires little transportation, minimal processing and has advantageous hydrothermal performances. Also, it contributes to develop the human capital and the associated know-how.

The DSA-Earthen architecture programme, initiated in 1984, is a specialisation diploma accredited by the French Ministry of Culture and organised by the Grenoble National School for Architecture. It is accessible to post-master students (engineers, architects, archaeologists, historians, sociologists, etc.) willing to specialise in earthen architecture, both in the fields of heritage conservation and contemporary construction. From 1984 to 2022, 395 people have attended this diploma course.

Earthen architecture exist in more than 150 countries and can be found on 20% of the UNESCO World heritage sites in the form of archaeological sites, monumental heritage, vernacular heritage, cultural landscapes and cities. In these contexts, earthen architecture is subject to various pressures such as: poverty, development of industrial materials, wars and effects of natural hazards. The challenge is to provide the graduated students with tools to develop earthen architecture in this heteroclite and constantly evolving world.

The DSA-Earthen architecture programme includes 9 teaching units spread over two years, for a total of 2400 training hours including 890 supervised hours, 800 personal working hours and 710 professional experience hours. Through lectures and practical work, the first seven months allow to approach five educational units: 1) Earthen architectures and building cultures; 2) Scientific, technical and methodological bases on earth material; 3) Earthen heritage; 4) Contemporary earthen habitat; and 5) Experimentations and exchanges in an international festival. The following months are dedicated to the consolidation of the competences through the following units: 6) Real-life professional situation; 7) Practical works and implementation; 8) In-depth seminars; and 9) thesis.

The DSA-Earthen architecture programme, its organisation and pedagogical methods allow to train professionals whose abilities exceed the purely technical skills. It allows to develop critical thinking and promotes locally adapted responses to the needs. It is relevant for tomorrow's society that will have to manage increasingly complex challenges.
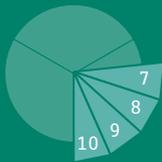
→
Training session during the DSA-Earthen architecture

(credits: S. Moriset, A. Carbonnelle)
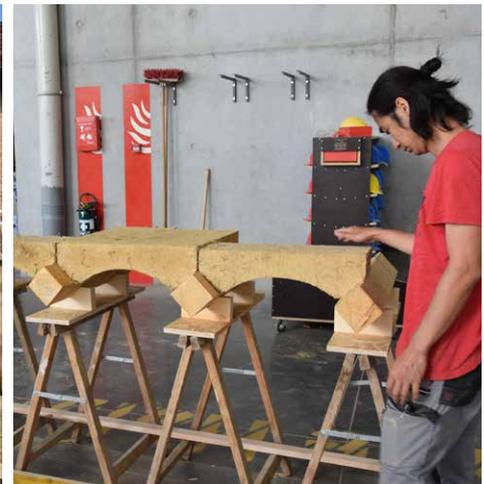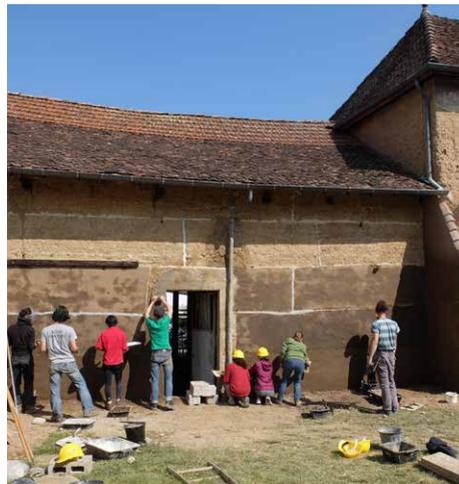
WORKSHOPS ON TRADITIONAL TRADES AND PRESERVATION OF TRADITIONAL TECHNIQUES

Camilla Mileto, Fernando Vegas, Valentina Cristini, Lidia García-Soriano
Universitat Politècnica de València, Valencia, Spain

The Res-Arquitectura group of the Pegaso Centre for Research in Architecture, Heritage and Management for Sustainable Development, within the framework of the Universitat Politècnica de València (Spain), has been organising for the past decade workshops on traditional building trades and techniques that are open to the general public. Activities have been carried out both in nursery and elementary schools to raise awareness concerning traditional earth and wood building techniques in the youngest children; at the university summer school with children between the ages of 6 and 15; and on the university campus with architecture students from various countries, as well as with architects, masons, craftsmen, property owners or self-builders who seek knowledge of a construction technique for reasons of curiosity, training or simply for personal development. Specific workshops have also been organised for groups of university students from the École de Chaillot in Paris or the SAL - School of Architecture from Ahmedabad, India, as well as for restoration professionals from all over Spain and several European countries (Portugal, France, Italy, United Kingdom, Ireland, etc.). Workshops are also regularly used as a complement to theoretical lessons at the Universitat Politècnica de València. Children rejoice in carrying out manual activities, a skill they have not yet lost; architecture students rediscover this craft through the production of building materials that they have only abstractly studied at university; masons and craftspeople open new horizons in their profession; and established technicians learn new ideas and techniques as part of a process of continuous learning. Practical workshops have been carried out on construction with rammed earth and its variants (whitewashed rammed earth, real rammed earth that mixes earth and lime, rammed earth with exposed bricks, etc.), masonry, ashlar masonry, hot-mixed lime mortars, the production of adobe or compressed earth blocks (CEBs), and the construction of tiled vaults using both adobe and CEBs, etc. Workshops have been conducted by both university professors and craftspeople possessing the manual skills and technical knowledge. During these workshops, craftspeople specialised in the trade have been invited to offer advice and contribute with their knowledge to the recovery of these traditional techniques.

USERS
General public: children, architecture students, architects, masons, craftsmen, property owners, self-builders

VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
2. Taking benefit from natural and climatic resources
3. Reducing pollution
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
12. Promoting local activities
13. Optimising construction efforts
15. Saving resources
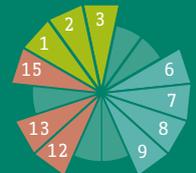
Workshop for adults and practical activities for children
(credits: authors)

THE FIRST TRADITIONAL ARCHITECTURE SUMMER SCHOOL IN PORTUGAL

Rui Florentino, Portucalense University, Porto, Portugal;
José Baganha, INTBAU Portugal, Porto, Portugal;
Alejandro García Hermida, Universidad Politécnica de Madrid, Madrid, Spain

USERS
International students, local
people

**VERSUS SUSTAINABILITY
PRINCIPLES**
1. Respecting nature and
   landscape
2. Taking benefit from natural
   and climatic resources
3. Reducing pollution
6. Preserving the cultural
   landscape
7. Transmitting and sharing
   building cultures
8. Encouraging creativity
9. Recognising intangible
   values
12. Promoting local activities
13. Optimising construction
    efforts
15. Saving resources

5th Traditional Architecture
and Urbanism Summer
School in the area of Beirã,
municipality of Marvão, July
2018
Presentation of the school
projects
(credits: authors)

Traditional Architecture Summer Schools started in Spain in 2014, organised by the Rafael Manzano Prize and INTBAU (International Network for Traditional Building, Architecture and Urbanism). After the first years in the city centres of Madrid and Seville, it began to look for smaller traditional sites, where international students could learn about local vernacular heritage.

In 2018, the Traditional Architecture Summer School was extended to Portugal, with the first edition held in Beirã-Marvão, Alentejo. Since then, the Ekaba and Serra Henriques Foundations got involved in the project, along with local authorities, stakeholders and citizens, in order to promote a sustainable development, and of course a large number of university representatives also took part, with teachers and students, such as from the Escola Superior Gallaecia (which since then has become part of the Universidade Portucalense) – besides Portuguese and Spanish nationals, there were participants from Germany, England, Guatemala, Mexico, India and Brazil.

The Traditional Summer School had to respond to an architectural challenge proposed by the Heritage Department of the Portuguese Infrastructure Company, which was to connect the two sides of the town of Beirã, multiplying ways to cross the former railway lines, while keeping a reduced strip between them, ready for a hypothetical future return to its lost railway function. In general, it was agreed to provide the property with a variety of architectural and urban solutions, not longing for the past, but seeking a bright future, while respecting its traditional culture and heritage, the keys for its recent signs of revival.

These were not easy goals for a group coming from all over the world. There is a need for an intense immersion in local building, architectural and urban traditions, assisted by experts, and a remarkable commitment from all the participants, to get the best out of those lessons and proposals.

During the last days, a couple of students worked on local details for a catalogue with urban, architectural and building patterns, developed during those two weeks, while the rest of the group gathered the design proposals for the village, with the involvement of the community.

In these Summer Schools, there is always the purpose of preserving local identities and valuing heritage – only in this way can culture, as well as the urban and architectural traditions, be kept alive. This initiative allows sharing new knowledge, not only between students, but among local people, which happened also the following years, in Cantabria (2019) and in Pico Island, in the Azores archipelago (2022).

TEACHING VERNACULAR ARCHITECTURE: DIFFERENT PEDAGOGICAL APPROACHES IN HIGHER EDUCATION

Telma Ribeiro

CIAUD-UPT, Department of Architecture and Multimedia Gallaecia, Portucalense University, Porto, Portugal

Vernacular architecture offers a wide range of lessons that can be taught in the courses of architecture and urban design degrees. By applying progressive and strategic methods, these lessons are addressed in nine different courses of the Integrated Masters of Architecture and Urbanism at UPT. This represents almost 20% of the credits of the Integrated Master's programme. The approach began at the Escola Superior Gallaecia and is now continued at Portucalense University (UPT), following the integration of the school into the University, in September 2021.

Portucalense University promotes pedagogical innovation through regular training programmes, open to all its professors. It intends to change the interaction between students and professors, creating a positive environment where creativity and engagement are valued. One of the most effective ways of involving students with vernacular architecture is the Project Based Learning method. This tool engages students in real-case scenarios, stimulating communication skills, creativity, and critical thinking. In the course of *Materials and Construction Analysis*, students were asked to choose traditional and sustainable materials and to develop a project where they researched the selected material from a critical perspective. In the end, students present their work on a public exhibition with a poster, an oral presentation, and a sample of the material. Another example was developed at the *Design Studio-Concept* course, taught by Dr. Gilberto Carlos and Dr. Luís Paulo Pacheco. In this case, students were asked to create a traditional timber structure to be constructed at the university campus. They proposed different projects, and professors and students selected the most consistent proposal to be built. Besides the development of the design and function, students were engaged in the preparation of the materials and throughout all the construction phases. Finally, another pedagogical approach towards vernacular architecture is the students' participation in workshops. In that same course, a visit and a workshop were organised at an architect's studio that works exclusively with traditional and ecological materials. Following a theoretical presentation, students participated in a practical workshop of *Yakisugi* – a traditional Japanese technique that preserves wood by superficially burning it. The know-how acquired by students was skillful and contributed to a worthwhile learning process experience.
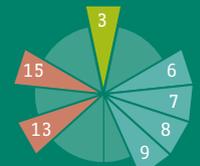
Posters and samples of traditional and ecological materials

Pergola developed by the students and implemented on the university campus

Yakisugi workshop

(credits: T. Ribeiro)

TRAINING WITH CRAFTSPEOPLE AND MAINTENANCE OF TRADITIONAL KNOWLEDGE

Sebastien Moriset
CRAterre, Grenoble, France

The loss of know-how is a disaster for the preservation of vernacular architecture and the intelligence it carries. Centuries of accumulated experience in building with local materials are being wasted. Where vernacular architecture is still practised, the informal transmission of knowledge from father to son or from craftsperson to apprentice is rapidly dying. Knowledge transfer is a prerequisite to ensure that the best possible conservation practices are implemented and that contemporary designers understand the materials and techniques of the past in order to be able to propose reinterpretations adapted to present-day realities.

Learning by doing

For the knowledge of vernacular architecture to be effectively transmitted, a practical approach is necessary. In the context of heritage conservation education, learning by doing is a basic requirement. Specialised conservation-architects often go through internships on conservation sites where they are able to understand the manual dimension of the trade by practising alongside experienced craftspeople: earth masons, stone carvers or carpenters. This is rarely the case for architects or engineers who can obtain their diploma without ever having worked on a site or met with craftspeople. The consequence of this overly theoretical training in architecture is that contemporary designs are sometimes fraught with constructive inconsistencies, inadequacy with the tools and knowledge available in the construction area or unsuitability for the climate. In areas where vernacular architecture is still alive, designers and craftspeople are the same people. By mastering the use of locally available materials, they hold the keys to good design that will not cause hassle at the site. They know the tricks of the trade, they know which spans are possible between walls, which elements need to be reinforced to resist climatic hazards and which mistakes must be avoided. In this way, they design in anticipation of the realities of short-term construction and long-term maintenance.

Getting students to do site work

The architecture educators who have participated in the *VerSus* and *VerSus+* programmes are well aware of this essential link to the building site. They all organise site sessions or festivals where students and craftspeople come together and work hand in hand to exchange knowledge. Students who are lucky enough to go through these practical learning phases come out better equipped to produce architecture that is resolutely contemporary, although inspired by the constructive intelligence of the past.

Working with traditional knowledge provides the inspiration to define new codes that architecture is seeking to be more sustainable.

Combining the intelligence of the designer with that of the craftsperson

The renowned architects of today, such as the Austrian Anna Heringer, the Burkinabe Francis Kéré and the Chinese Wang Shu and Liu Wenyu, are comfortable with this relationship with materials. Their architectural production appeals to the common sense of vernacular architecture and values local craftspeople. They pay homage to the intelligence accumulated over the centuries, passed down through generations of craftspeople who have refined their practices by repeating the same gestures. These visionary designers are admired by new generations of architects and demonstrate that heritage can be the root for their creativity.

Another remarkable dimension of vernacular architecture is the care taken in implementing the work, as well as the quality of the decorations and construction details. This is due to the enthusiasm of the craftspeople in their work. In vernacular architecture, many details take shape at the very moment of construction. They have not been thought out in advance or drawn precisely before construction. One of the pleasures of the craftspeople is to be able to interact with the materials and adapt to the way they react, to create with their hands. This possibility of improvisation is theirs. This freedom may seem confusing to the architect who wants to draw up his plans down to the last detail. The academic world teaches architects to be the thinking heads who hand over their drawings to the docile craftspeople who must execute them. The architect must concede this margin of creativity in his projects and accept a random dimension at the time of construction. He must be able to delegate some of his ideas to other talents. Materials such as stone or earth permit a great deal of freedom. As they are not standardised, they are intuitive and stimulate originality. Allowing the people on the site to be creative gives them pleasure in their work. By enjoying their work, these people bring more care and intelligence to what they do. Creativity comes from this sharing of trust between designers and craftspeople, which adds up the intelligences instead of confronting them.

Designers who are attracted to traditional materials and techniques but lack experience on the building site need to work with experienced craftspeople to design realistic details that will not lead to complications in the implementation phase. A designer who has not experienced the intimacy of a material to feel how it works and how it reacts is not in a position to propose wise designs. It is absolutely necessary for him to dialogue and experiment with the craftspeople in the design phase to avoid pitfalls. This is often the case on contemporary earth construction sites, for example, where sample walls are erected to check the feasibility of proposed details.

Training and education of craftspeople

A good craftsperson is an autonomous person who has acquired sufficient technical maturity through repeated construction practice. It is always difficult for a practising craftsperson to stop work and learn a completely new material. He has neither the time nor the financial resources. Subsidised on-site training courses lasting from a few days to a maximum of one week are a good format for them. They are also great forms of knowledge transfer because the learners receive as much knowledge from the training instructors as from the other craftspeople present.

Political support and legal constraints

The revitalisation of craft skills must be supported by legal and political frameworks which require, or at least encourage, the use of local materials, implemented according to ancestral techniques. For example, the obligation to cover roofs with stone slates, as in the Aosta Valley in Italy, in turn creates a need for specialised labour and simplifies the setting up of appropriate training courses.

Many European national parks working to conserve their architectural values are setting up such mechanisms combining financial aid and legal frameworks. They also organise free training courses open to craftsmen as well as to the general public in order to give them the possibility to test vernacular techniques under the supervision of experts. This helps unskilled people to overcome their fears of facing an unknown material. The Livradois-Forez Park in France has taken such an approach to encourage good practice in rammed earth rehabilitation and construction. Their website provides technical documentation (a book, technical sheets, exhibition panels) abundant in information and examples that make people want to take good care of their earthen structures (www.pise-livradois-forez.org). It should be noted that another potential support to the sector from local authorities is the dissemination of directories of vernacular craftspeople who have received skills certificates.

To conclude on this question of training craftspeople and maintaining traditional knowledge, let us say that the man of the art (the architect) and the man of the trade (the craftsperson) must know how to combine their talents to conceive clever projects. The best builders in vernacular architecture are often the designers of their own work. Most contemporary architects working with natural materials are also excellent craftspeople, with both backgrounds. They thus combine the two forms of thinking,

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Building of the thatchted roof, Tanzania
(credits: author)

that of the designer, who shapes the space and models the materials through his culture, and that of the builder, who implements them in a rational and meticulous manner. This fusion of designer and craftsperson has always existed in vernacular architecture, or what Bernard Rudofsky calls "architecture without architects", where the designer builds what he has imagined and ensures the stability of his work over time. This is the case, for example, of the master masons in Timbuktu in Mali, who are responsible for the maintenance of the houses they design and build for life. It is understandable that they cannot afford to make mistakes, either in design or in construction, to avoid overburdening themselves with work during their lifetime. We need to build on these models that have proven themselves over time to allow architects to use their hands as much as their brains in their curricula.

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THE ARTISANS OF VENICE (IT)

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The artisans living and working in insular Venice are represented by Confartigianato Imprese Venezia, the trade association founded in 1945 which has provided support for 1500 artisans and small entrepreneurs, promoting the city's manufacturing history and valorising the traditional crafts of the various trade categories, with a specific focus on family-based businesses, who are the motor of the local economy.
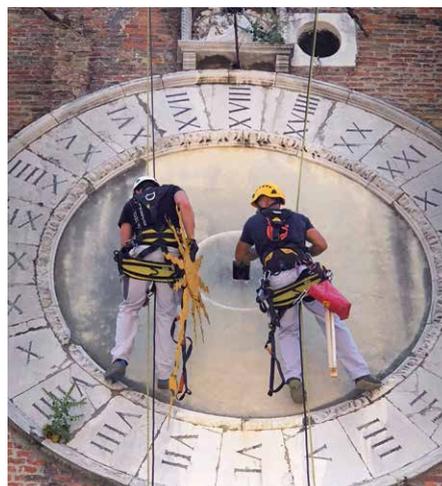
An articulated range of services supporting the competitiveness and digital innovation of companies has been added over time to the historical trade union and sector coordination functions. In parallel to this, training activities have been significantly developed, with continuous education courses for members and projects aimed at the preservation and recovery of artistic and traditional crafts, in compliance with the recent regional law no. 34/2018 *Norms for the protection, development and promotion of crafts from the Veneto region*.

The strengthening of artisan activities which are the repository of a know-how that is currently in danger of being lost as a result of contingent difficulties and an insufficient generational turnover, is also functional to the development of a quality strategy concerning maintenance interventions on the built heritage of Venice, since the revival of the use of traditional materials and techniques can serve to oppose the widespread tendency to replace historical structures, especially in the case of non-listed buildings.

It is with this in mind that a series of collaborative initiatives were conceived between Iuav University of Venice and Confartigianato Imprese Venezia which have involved the two institutions in theoretical-operational workshops, visits to production sites and research on traditional worksite practices, as well as in international exchange seminars in collaboration with institutions historically engaged in the preservation of craft heritage and skills.

A Memorandum of Understanding was recently entered upon which is aimed at sustaining the synergy between the academic and artisan worlds, especially with the purpose of activating forms of apprenticeship for architectural students at both artisan workshops and construction companies (scientific supervisors: Angela Squassina, Iuav University of Venice and Enrico Vettore, Confartigianato Imprese Venezia).

The consolidation of the practice of transmitting local traditional knowledge and skills - otherwise destined to be lost forever - aspires to a sort of 'passing of the baton' between the current custodians of Venetian building knowledge and the future generation of professionals entrusted with the preservation of the city's heritage. The cultural and operational involvement of artisans is also part of a careful and attentive approach to the cultural, social and economic dynamics of the area, which could also trigger dynamics favourable to the local labour context.

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
12. Promoting local activities
13. Optimasing construction efforts
14. Extending lifetime

Post-graduate students from the Specialisation School in Architectural and Landscape Heritage of the Iuav University of Venice (Italy) together with young students of the School of Construction from Padova during practical tests on traditional building techniques

(credits: Simon Richards, 2022)

Clock restoration phase. Venice, church of Saint Giacometto

(credits: Confartigianato Venezia, 2022)

ITALIAN DRY STONE WALLING SCHOOL (IT)

Edoardo Paolo Ferrari

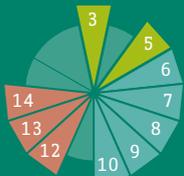Oxford Brookes University, Oxford, United Kingdom

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First meeting of the Italian
Dry Stone Walling School in
Cortemilia - credit Donatella
Murtas

(credits: E.P. Ferrari)

Second meeting of the Italian
Dry Stone Walling School in
Corna Imagna

(credits: Federico Padovani)

ITLA Italia APS (International Terraced Landscape Alliance Italy) association officially founded the Scuola Italiana della Pietra a Secco (Italian Drystone Walling School) in 2021. The school is not a physical place with a specific building, but rather a network of craftspeople and professionals that work with dry stone walling and are keen on disseminating this vernacular technique, fostering its transmission and valorising it. The school was officially established with the intention to strengthen the network of experts in the field and to welcome new people interested in the topic. Since no professional course for dry stone wallers is currently active in Italy, several craftspeople and ITLA associates are working to constitute the legal and practical framework in order to implement the first national training officially recognised throughout Italy. In line with this intention, several members of ITLA, guided by ITLA's craftspeople, have already organised two practical meetings. The first meeting took place in Cortemilia (Piedmont) in August 2021, which was the first time dry stone wallers from several regions in Italy met to compare their techniques and styles and to discuss ways of enhancing of the school and its aims. The second meeting took place in Corna Imagna (Lombardy) in April 2022 and it represented an opportunity to strengthen the network of professionals, as well as a moment of discussion concerning the professionalisation of this craft. In both meetings, the conversations and debates took place on a building site, where artisans were able to work in groups on the construction of a drystone retaining wall. This hands-on approach, allowed wallers to concretely observe each other at work while stimulating fruitful conversations regarding the craft among craftspeople and other professionals that attended the meeting. These were not only occasions for the exchange and transmission of knowledge, but also the necessary ground on which to establish educational and evaluative methods both for new apprentices and for those artisans who aspire to become master teachers of this technique. ITLA's members are looking forward to including more people in their group and training new craftspeople and professionals in the art of drystone walling, which was inscribed in the UNESCO Intangible Cultural Heritage list in 2018.

RESTORATION OF HERITAGE ASSETS PROGRAMME AT DUOC UC PROFESSIONAL INSTITUTE (CHL)

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Technical-professional education in Chile consists in non-university higher education and is deemed to be the natural heir of former Schools of Arts and Trades. It delves in depth into different disciplines with a practical focus, enabling graduated students to perform both hands-on and supervising work, while constantly adapting to the needs of the industry.

The *Restauración de Bienes Patrimoniales* (Restoration of Heritage Assets) programme at Duoc UC Professional Institute was created in 2007, after identifying the need of trained people to undertake material interventions in the city of Valparaíso, declared a World Heritage Site in 2003. It has the first curriculum in the country specifically targeted to the preservation of traditional crafts and heritage. Due to the absence of national benchmarks and training institutions that acted as reference to create this programme, it was necessary to reach for strategic alliances with institutions linked to cultural heritage and international organisations, such as the international cooperation agency IILA (Organizzazione Internazionale Italo-Latino Americana) which had a direct role in training both instructors and the first generations of students in 2005.

The conceptualisation of the technicalities of different trades is included in a competency-based model with 2340 hours of academic training, divided into 5 semesters, with an average of 52 credits per semester. These include subjects on traditional building systems, technology of materials, damage registering and assessment, as well as on carpentry and cabinetmaking trades, earth construction, gypsum, lime, stones, metals and concrete restoration, among others. Students complement their learning process with field trips to restoration works, seminars and conferences organised by the programme to cover contingent and relevant topics.

The strong presence of community engagement activities and the implementation of open workshops for students to exercise their skills complete the total-learning experience cycle, which requires consistent practice for improvement. In these exercises, students also effectively restore heritage assets valuable for communities who do not always have the appropriate resources to access technical expertise.

Since its creation, more than 200 restorers have graduated from the programme, participating in restoration works throughout Chile. These include the restoration of national monuments such as the cathedral of Santiago or the Salpeter Works in Maria Elena, as well as intervention in grassroots projects such as the community centre Ex-Capilla Santa Ana in Valparaiso or the Matta Sur neighbourhood headquarters in Santiago.
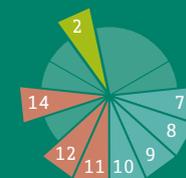
Student's practical work on the restoration project of Valparaiso's adobillo construction, ascensor Cordillera
(credits: A. Rivera Vidal)
New foundation and retrofitting process on the neighborhood headquarters in Matta Sur, in joint project with USACH
(credits: C. Gómez Maestro)

Strategies for the management and dissemination of traditional knowledge for a sustainable future

1 CONSERVATION AND DESIGN

2 EDUCATION STRATEGIES

3 COMMUNITY ENGAGEMENT

4 KNOWLEDGE MANAGEMENT AND DISSEMINATION

TRADITIONAL HERITAGE PRESERVATION AND ENHANCEMENT THROUGH COMMUNITY PARTICIPATION

PARTICIPATING IN BUILDING AND RESTORING VERNACULAR HERITAGE

GAMIFICATION FOR COMMUNITY ENGAGEMENT IN HERITAGE AND SUSTAINABILITY

COMMUNITY ENGAGEMENT

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Architects are understood as being responsible for the construction of buildings and artefacts, as well as for different modifications and interventions that define our spatial environments. They have a clear influence on our relationships through the constructions they propose, but sometimes they use a formal approach which marginalises the meanings inherent in places. This results from a failure to consider in-depth analyses of the social nature of existing spaces that are inseparable from their technical, constructive, typological, or general architectural characteristics.

On the other hand, educational systems are generally responsible of producing the social changes deemed necessary for the future. However, in the case of architectural studies, schools can become intentional agents of cultural discontinuity, a type of discontinuity that neither reinforces traditional values nor recruits young people to become part of the existing system (Batallán, Campanini, 2008). Rather, they recruit students for a system that does not yet exist, or is still emerging. Inevitably, this produces conflicts, since sometimes the knowledge conveyed in schools of architecture isolates their future architects from the cultural system they intend to serve. 'Architect houses' is a popular expression, which means housing that follows aesthetic ideas and mantras far different from the cognitive models of mainstream society, that is to say, from the spaces in which a large part of the population has been socialised. One needs to take into account not only the direct client, in other words he who orders the work, but also all those who, in one way or another, will be affected by the scenery of social life, even if only through the facades of the buildings. It is also necessary to bear in mind that environments materialise values, as well as help to develop resilience in the face of special and extreme situations. They help to maintain and support daily activities otherwise eroded by catastrophe, and allow losses of all kinds to be overcome more quickly.

Therefore, it is essential to implement strategies based on the importance of the relationship of space and people as a mediating agency between the physical form of their communities and their ever-changing culture (Arkaraprasertkul, 2009).

The use of participative methods is an important tool for design, since it is possible to think further and create project modes that actively integrate all of the actors and stakeholders involved. This is based on the understanding that knowledge is always polyhedral and enhanced by the confluence of different perspectives that strengthen joint action as a community. This requires architects to be interested and willing to ask questions concerning the rationale behind certain activities that take place in

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European Heritage Training Course "Architectural documentation of traditional wooden architecture" at Kozichkovi Houses in Kotel, Bulgaria
(credits: European Heritage Volunteers)

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Participatory workshop with the inhabitants of Piazza Valdelsa, within the project *Parole in Piazza* by Sale Grosso and Avventura Urbana (2023). Florence, Italy

(credits: Sander Marra)

the community, rather than to just think about the characteristics of the architecture and the physical conditions. Only by developing an awareness of multiple existing dynamics, can they avoid becoming agents of discontinuity. This type of engagement enables a consideration of the different perspectives present in architectural spaces, and provides a broader view of reality (Nyumba et al., 2018). It also implies a re-evaluation of practices, norms and management styles which might otherwise be taken for granted, or applied without critical evaluation.

This highlights why it is important for architects to undertake participative engagement with communities, as a way of developing an understanding of the microcosm in which they work. This is relevant, because it will assist architects in finding strategies that will help them capture the various issues they must attend to, which pivot from the most specific issues related to the direct orders of their private clients, to those other variables that are related to the community where the project will be located. It should not be forgotten that individual processes do not cease to be social since they always start from a social reference (Stewart et al., 2013).

At the same time, incorporating these strategies enables knowledge and allows it to increase, and also generates opportunities for post-occupancy evaluation, permitting architects to learn steadily from each project they have designed. Therefore, architects improve their knowledge concerning the importance of the built environment, its spaces and physical forms, in order to better understand the behaviour of its inhabitants (Suri, 2011). Furthermore, developing the awareness that the learning process must address and deal with issues of a formalistic and symbolic nature is a necessary step towards ascribing meaning to architecture.

It is paramount to bear in mind that architecture provides conditions for being human and responds to the human condition. There is a need to rethink the philosophy underlying the material manifestations that, roughly, are induced in projects from the community, considering that the architects in

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European Heritage Volunteers Project *Conservation works at a fortified church complex* **at the ensemble of the fortified church in Hosman, Romania**
(Credits: European Heritage Volunteers)

charge of shaping their homes must be agents attached to their worldview. If not, they could be viewed with suspicion (Pallasmaa, 2012).

Equally, it is important to explore the architectural conditions that support and are part of socio-cultural structures. Architecture has been, since ancient times, a tool in the hands of power, using buildings to display a capacity for influence over others. At the same time, the teaching of architecture has in some ways participated in this dynamic, by limiting and restricting knowledge to one type of architecture over another. This has resulted in the implementation of homogenising processes that, in late-modernity, have brought about the uniforming of constructions within territories, thus causing the progressive modification of traditional landscapes based on the specific collective cognitive models. To counter this, it is imperative that community engagement strategies are incorporated into the design process.

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TRADITIONAL HERITAGE PRESERVATION AND ENHANCEMENT THROUGH COMMUNITY PARTICIPATION

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Heritage is a constantly evolving subject and it is up to all of us to keep it alive. The conservation and management of vernacular architecture cannot be the sole responsibility of heritage architects and specialist craftsmen. Citizen participation in heritage conservation efforts is crucial and is growing at an unprecedented rate. In recent decades, heritage institutions have been working on heritage policies that increasingly involve citizens in the study and implementation of actions. Publications and symposiums under the aegis of major institutions such as UNESCO, ICOMOS or ICCROM have been widely promoting participatory heritage management mechanisms.

Why involve people?

Conserving vernacular heritage is only possible if citizens are able to appreciate the exceptional values that this heritage gives to their landscapes and living environment. Citizens who are insensitive to heritage values become unpredictable enemies of the conservator. Conversely, conservators who are not open to the values perceived by the citizens have a narrow view of the sites and can also destroy important heritage dimensions. Collaboration between professionals and civil society is therefore essential. Heritage professionals must be the ones to accompany processes that enhance the awareness of the inhabitants, who must proudly feel the sense of belonging to a unique place. In order to preserve heritage, legislating and penalising is not enough, it is necessary to anticipate irreversible and harmful interventions through education and community mobilisation. It is certainly impossible to turn every citizen into a conservator, but it is necessary to multiply the awareness of heritage values within the group in order to develop this collective responsibility of vigilance in the evolution of the living environment. All it takes is a few committed citizens to set good examples and instil the desire to perform well in terms of conservation. The more people are aware of and involved in conservation, the more they feel they have a stake in the quality of their environment. Below we describe some of the conservation and enhancement actions that are commonly implemented with community participation.

Heritage Days

The European Heritage Days have existed for 40 years and have become an unmissable event in our annual calendars. They allow us to look up at our great monuments but also to strengthen our affinity with vernacular architecture and all the landscaping that surrounds it. This encounter with the past

offers the public the means to put down roots in the territory that welcomes them by understanding the practices of the past in terms of economy, use of resources and environmental protection.

These days are also an opportunity to showcase conservation-related professions. This encounter with professionals promotes respect for these trades and can even encourage young people to take up these professions. We know today that heritage conservation constitutes a melting pot of valorising careers that cannot be sub-contracted to unqualified external professionals. Not only do they contribute to maintaining the remarkable identities of our cultural landscapes, but they also strengthen the resilience of populations.

Participatory inventory and identification of values

One of the starting points for participation is the identification of vernacular heritage values, followed by an inventory of the attributes that carry these values. These exercises can take many forms and need good guidance to be successful. They can be carried out on a landscape, village and even city scale, as was done in Lyon, France for the participatory inventory of the city's earthen buildings. The advantages of a participatory inventory are multiple. The first advantage is the multiplicity of points of view. The inhabitants know the heritage in which they live better than the heritage professionals who visit their territory. This kind of participatory research allows the community to express all the knowledge it holds and which scientists would take years to obtain if they had to work alone. By being recognised and listened to, the inhabitants feel valued and heritage becomes a more accessible field for them. If the inhabitants are prepared for the inventory, through a presentation of the *VerSus* wheel, for example, abundant data can be obtained. The other advantage is the mobilisation of good will and the development of shared dynamics by the users of the same geographical entity. During these moments of common reflection, heritage can create intergenerational and intercultural bridges.

The technical means to be mobilised for the exercise can range from simple paper forms to be filled-in during public inventory days, to dedicated digital platforms that the inhabitants can complete by

themselves over several months, directly on their computers. It is of great importance to then provide feedback to those citizens who give their time to this type of exercise. Once the raw inventory data has been processed, exhibitions, posters or rehabilitation sites are essential to encourage participants to continue their efforts in the long term.

Preparation of heritage charters

Once the values have been determined with the people, it is necessary to go into more detail to decide which are the good physical attributes that carry these values and which are the bad attributes that should be removed. In terms of architecture and landscape, this requires going through each of the attributes one by one and producing a graphic document showing the good examples to follow and the mistakes to avoid. Doing this work together with the inhabitants makes them aware that every detail counts and that every mistake, however small it may be, contributes to the deterioration of their cultural landscape. This is how, in the course of discussions, they will decide, for example, to ban PVC window frames, to forbid extensions that are too high or to ban non-endemic tree species in the gardens. It is possible to create such charters without the people, but then it becomes very difficult to enforce the proposed regulations. By drawing up these charters in a participatory manner, vigilance reflexes and good practices are developed in the population. An example of a simple illustrated document, produced in a participatory manner, is the guide to urban standards of Cidade Velha, a World Heritage site in Cape Verde (https://craterre.hypotheses.org/2151).

Participatory management

Heritage sites are complex environments to manage from both a technical and social point of view. Cultural landscapes have been built over the centuries and are not the result of the work of one person but instead of the work of groups who have managed to join forces, build and conserve their properties over the years. These practices of uniting forces and intelligence are at the origin of

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Pages of the urban regulations guide of Cidade Velha (Cape Verde) prepared with the participation of the inhabitants

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Participation of the inhabitants to the analysis of the site in Wa, Ghana
(credits: author)

remarkable architectures such as the Chinese Tulous or the Ksours of the Maghreb. Community work plays an essential role in the durability of this architecture. Pooling forces and sharing the hardest seasonal work took place automatically in rural societies throughout the world, yet these participatory management methods are being lost. People, as cultural custodians of sites, are the greatest resource required by conservation. Conservators and scientists cannot have a monopoly on decision-making. Conservation therefore requires a social approach alongside technical expertise. Maintaining or reviving participatory management mechanisms to coordinate stakeholder groups is a more difficult task than plastering a wall, but it can save villages and towns. Many case studies prove that involving local residents in the conservation of sites is an opportunity for the populations to reappropriate their heritage.

Conservation sites open to the public

The quality of a vernacular heritage depends to a large extent on the maintenance practices and transformations it undergoes. Too many assets suffer from inadequate practices which use inappropriate materials. However, the perpetrators of such malpractice are simply applying what they have been taught by training institutions or what the commercial materials dealers are offering them. It is not easy for these actors to change their method or habits. One of the ways to achieve this is to expose them to other practices on building sites that are not under their responsibility. Participatory workcamps supervised by a conservation professional are good platforms for everyone to learn about non-conventional building techniques and gain the confidence or knowledge that they lack to implement good practices. These workcamps are often organised by regional heritage institutions or regional nature parks who support municipalities to host such events.

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TERRACCOGLIENTE EXPERIENCE

Walter Secci
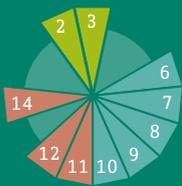Associazione Internazionale Città della Terra Cruda

➔
Bread-making workshop
Traditional arts and crafts
(credits: M. Achenza)

Terraccogliente is an activity devised by the International Association of Earthen Cities, an association which gathers around 40 municipalities in Italy and abroad. These towns, mostly small villages, share the recognition of the value of architectures and settlements built with earth as components of the identity of the landscape that characterise their territories, and indicate them as the foundation for a model of sustainable development.

The Association promotes the reuse of earth as building material in the contemporary building supply chain, focusing on the protection, recovery and reuse of traditional earth buildings and encourages the use of natural materials in construction.

Terraccogliente includes a tourist-cultural itinerary that unfolds around the houses built with earth which are open to visitors with the diffused-hospitality formula. The main goal of the programme is to promote the conservation and recovery of the traditional historic earthen buildings, as part of the identity heritage of the communities involved. During the events, the earthen houses host hands-on activities aimed at acquiring knowledge about the building material earth, artistic and craft activities, food and wine-tasting, ethnographic exhibitions, photographic exhibitions, art, architecture, and design installations.

Unmissable opportunities to savour the soul of the place, experience authentic, distinctive, and sustainable hospitality and feel part of the hosting community.

During the *Terraccogliente* events, good practices are presented for the conservation and rehabilitation of traditional earthen architecture that use natural and sustainable materials, giving particular attention to aesthetic and living comfort.

With *Terraccogliente*, the Association seeks to raise awareness among the owners of earthen houses about the fact that they are the proprietors of a very important historical-architectural heritage and therefore of a significant cultural value to be protected.

The activities also include educational tours aimed at students, planners and building operators interested in discovering the world of raw earth architecture. The tours include a visit to the earthen architecture documentation centres, located in Samassi (Sardinia) and Casalincontrada (Abruzzo), the participation to hands-on workshops to learn about the building material earth and its construction techniques, and visits to buildings of historical and architectural interest.

## EL CABANYAL: NEIGHBOURHOOD PARTICIPATION AGAINST URBAN EXPROPRIATION

Camilla Mileto, Fernando Vegas, David Morocho

Universitat Politècnica de València, Valencia, Spain

The maritime villages of Valencia, namely Canyamelar, Cabanyal and Cap de França, known collectively as El Cabanyal, were originally an old fishing settlement traditionally linked to the city of Valencia which, at the moment of its foundation by the Republic of Rome, was located 5 km inland, in a meander of the Turia River. These settlements, originally composed of huts with earthen walls and steep thatched gable roofs, were transformed during the late 19th and early 20th centuries into an urban fabric of row houses in the Art Nouveau style, which reflects in the geometry of its plots the previous existence of those old huts. The city of Valencia expanded from its historic centre, reaching the district of El Cabanyal in the 1980s. In 1998, the Municipality of Valencia initiated a process of expropriation of an important section of the district in order to demolish it and to create a large avenue of access to the sea, following a project which had been drafted in the 19th century. In response to this threat, the neighbourhood's population mobilised and fought for almost two decades to prevent the destruction of the district, appealing to regional, national and international legal and judicial instances and giving visibility to this battle for the survival of the neighbourhood, which was finally saved from demolition, and is an extraordinary example of resilience and of grassroots defense of the built heritage. The neighbourhood which was thus saved will be remembered by future generations for the resistance it put up against the destruction that had been planned by the Valencia City Council. Today, despite the urban wounds from that period which still need to heal, it has become one of the most charming neighbourhoods in Europe.

VERSUS SUSTAINABILITY PRINCIPLES

1. Respecting nature and landscape
2. Reducing pollution
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
13. Optimising construction efforts
14. Extending lifetime
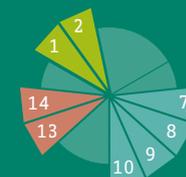
Perspective of the quartier with a colorful row of houses
Art Nouveau tile façade typical of the area
(credits: D. Morocho)

ADOPT A HOUSE IN ROSIA MONTANA, ROMANIA

Stefan Balici
Ion Mincu University, Bucarest, Romania

Rosia Montana is a small historic mining town in Romania's Western Carpathian Mountains, where an exceptionally rich and valuable cultural heritage – recently inscribed by UNESCO on the World Heritage List – has been for the past decades under pressure from a proposed large-scale open cast mining project. This has triggered major changes in the local society, with most of the population being displaced, and an intense debate at the national level concerning the clash between insensitive one-sided development, and sensible, fragile, local values – cultural, natural, social. This conflict has drawn Romania into an ongoing international arbitration case.

Under these circumstances, with the local heritage and community largely abandoned and under threat, ARA has teamed up with 'Alburnus Maior', and later with 'Rosia Montana in UNESCO', the NGOs of the resisting locals, in order to create and run a programme for rescuing the valuable built heritage. The core idea is to help rediscover, reassess and preserve local cultural values, through participation, learning and action.

Since 2012, the programme has brought together hundreds of volunteers, donors, supporters, and locals, to work together on valuable historic houses, churches and community structures. Among the aims of the programme is to help people rediscover and reasses their heritage, and to understand the high potential it has of being raised to our present living standards and of responding to our present society's needs and crises. Energy efficiency, economy of resources, consideration of the environment and adaptation to local climate – all these qualities which are inherent to cultural heritage are added to cultural values, beauty, and local specificity. And all these elements together constitute a network of high local values

VERSUS SUSTAINABILITY PRINCIPLES

4. Ensuring environmental comfort and wellbeing
5. Reducing disaster risks
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
11. Supporting autonomy
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources
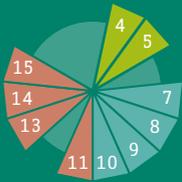
➔
Lapidarium roof at the local state-run mining museum. The new structure shelters precious Roman and mediaeval heritage

Demonstration of formwork construction with stone and gypsum filling during the Colloque international – Le plâtre en construction, organised by Rempart in February, 2019 at the Bergerie Nationale de Rambouillet

Local architecture before and after the intervention
(credits: S. Balici)

Campania 2015
www.adoptaocasa.ro
Adoptă o Casă
LA ROSIA MONTANA
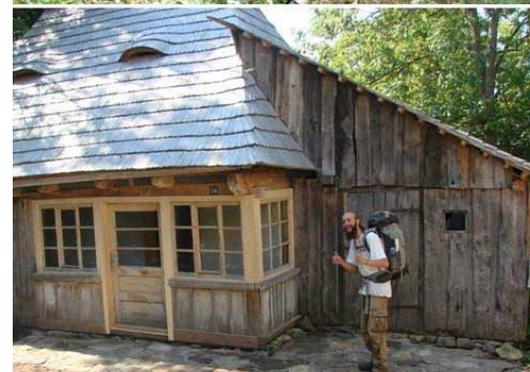
ANDEAN ARCHITECTURE AND EARTHEN CONSTRUCTION LAB

Julieta Barada, Jorge Tomasi

Universidad Nacional de Jujuy, Tilcara, Argentina

Earthen construction technologies have historically played a very important role in architectural production in the Andean area, and are also central nowadays, as continuous practices inseparable from other dimensions of social life, at both the domestic and community scales. Technologies and architectures are constituted as social facts, considering their associated practices and knowledge, from a dynamic condition that is not alien to broader processes that include tourist activities and the action of various state policies linked to heritage valorisation.

In this context, the *Laboratorio de Arquitecturas Andinas y Construcción con Tierra* (Universidad Nacional de Jujuy), located in the town of Tilcara, has been developing actions for the conservation of earthen architecture from the joint interaction between communities, state agencies and scientific institutions, based on collaborative approaches with an ethnographic perspective. Ethnography is a relevant procedure for thinking about these architectures, in many cases protected as heritage, based on the perceptions, practices and ontologies of local communities, considering tensions associated with different valuation principles.

In this framework, collaborative approaches are constituted as an unavoidable path to be explored, which in the projects developed involves practices that go beyond consultation and obtaining information, to focus in a radical way on the very development of the project as a whole, including its different phases. This ranges from implementing participatory workshops for the carrying out of the diagnoses themselves, as spaces where it is possible to raise the degree of complexity even of the conception of the building problems, to the overall development of the intervention projects, starting from the local constructive cultures and the incorporation of compatible resolutions for consolidation when necessary. Likewise, the execution of the interventions is presented as another central instance within the processes of joint learning, from the actions themselves with the materials as a form of transmission, strengthening and reinterpretation of knowledge.

These collaborative perspectives are presented as a contested field, rather than as a static tool, in which the diversity of viewpoints must be activated, challenging hegemonic perspectives that tend to be present in disciplinary approaches.
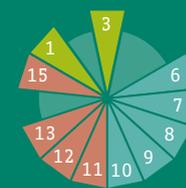
Participatory workshop for the diagnosis of the Church of Tabladitas, Tabladitas Community, Jujuy, Argentina

Restoration of the mud roof of Casa del Marqués , Community of Yavi, Jujuy, Argentina

(credits: authors)

PARTICIPATING IN BUILDING AND RESTORING VERNACULAR HERITAGE

Fernando Vegas, Camilla Mileto
Universitat Politècnica de València, Valencia, Spain

Historic antecedents

Architecture as a collective process is not a 21st-century invention. Traditional architecture, vernacular dwellings, different types of pre-industrial architecture and even religious architecture or other collective types of architecture are often the result of a communal process, as seen in many parts of the world and in many cultures where homes for newlywed couples were built with the help of the community. Equally, in some cases the entire family or friends and neighbours took part in the repair or maintenance of dwellings (Mecca, Dipasquale, 2009). For many years neighbourhood conservation festivals have also made it possible to carry out any maintenance needed on buildings, especially those built with perishable or fragile materials such as mud rendering and plant roofs. Many of these festivals and gatherings are still held frequently in societies in greater need of displays of community solidarity or in developing countries such as Mali, where every January, following the rainy season, a collective festival is held to repair the mud rendering of the mosque in Djenné (Mileto et al., 2023).

In other cases, there are instances of exchanges of professional favours, with no economic incentive, a clear indication of how this archaic procedure predates the invention of money. These exchange actions still exist in the countries mentioned earlier and are even latent, harking back to yesteryear, in other more developed ones, such as the *pernallom* in Valencia (Spain).

There are also new forms of social currency, which from the fringes have taken off in many developed countries such as Canada, Great Britain, France, Spain, etc. These are based on the exchange of tasks or products which are given a fictitious value in terms of currency, making it possible to balance out these bartering options. These include LETS (Local Exchange Trading System, Local Employment and Trading System or Local Energy Transfer System), SEL (Système d'Échange Local), SOL (Sistema de Organización Local), CES (Community Exchange Systems) and the Euskos, used in the Spanish and French Basque Country. Other internationally known systems are the Mutual Credit Trading Systems, Clearing Circles, Trade Exchanges or Time Banks. In France there are also a hundred RERS (Réseaux d'Échanges Réciproques de Savoirs), similar systems based on the exchange of knowledge (Yasuyuki Hirota, 2015). Among the hundreds of associations behind this alternative currency system based on time, work or knowledge we find SEL'Idaire in France, l'Acorderie in Québec (Canada), Fureai kippu (Caring Relationship Tickets) in Japan, Rozlet'se in the Czech Republic, Suska Kör in Hungary, or the now defunct Fundación Sostenible y Creativa, pioneering in Spain (Yasuyuki Hirota, 2015).

opposite page
Collective learning and building test of a tile vault in Baasneere, Burkina Faso
(credits: authors)

⬆

Man plastering a wall with mud, Burkina Faso
The periodic plastering with mud and straw of earthen houses in many African countries is generally a collective neighbourhood work
(credits: Javier Gómez Patrocinio)

Manufacture of manual tiles in the castle of Guédelón, France
(credits: F. Vegas)

Voluntary work

Currently, the active participation of volunteers in the construction or restoration of heritage, comprising citizens, students or even professionals making use of their free time, is becoming increasingly frequent in society. This takes the form of practical workshops, work camps, self-build collective actions, community gatherings for construction or repairs, etc. These bring together a group of people, often eclectic, with a common aim: the collective undertaking of the construction of a building, generally resorting to traditional, environmentally-friendly or alternative construction materials and techniques; or the maintenance, repair or restoration of a building which society considers to be communal architectural heritage, irrespective of whether it has been granted urban, legal or official protection by the relevant authorities. Citizen participation in the defence or restoration of architectural heritage through actions, workshops or work camps often arises in one or several of the following circumstances: abandonment by the authorities or those in charge; the outside threat of disappearance or destruction acting as a catalyst for forming collectives; or the lack of funding to restore a communal asset that is esteemed by residents. The selfless participation in the construction or self-build of a collective building is usually associated with the alternative or ecological nature of the construction, resorting to construction forms, materials or techniques that are either ancestral or reinterpretations of tradition.

Polysemy and influences

The active participation of volunteers in the collective construction or restoration of a building is an act which holds numerous meanings, implications and interpretations (Rempart, 2023; European Heritage Volunteers, 2023):

- It is a citizen participation movement that is completely apolitical, driven only by the joint objective of collective construction or collective restoration. These are grassroots movements

made up of citizens defending a common objective, generally calling for ecological constructions or the defence of heritage.

- It has the advantage of teaching traditional construction trades not only to master builders or builders who are already working in the setting, but also to owners, interested individuals, students, apprentices and any other volunteers who have shown an interest in taking part.

- It brings all these artisanal techniques closer to citizens who, with a newly acquired better appreciation and awareness of similar constructions, are able to identify the work involved.

- The manual learning of these trades is a discovery which has brought great satisfaction and happiness to the majority of participants, far more used to office or computer tasks than to this type of manual labour.

Difficulties

Citizen participation in this type of action must often overcome the individualism of contemporary society, prompting solidarity from a sector of society. Moreover, many of these initiatives are unsuccessful for a number of reasons.

- The regulations of individual regions or countries do not provide for the participation of unskilled people in construction or restoration work, especially in the case of interventions in protected buildings often requiring specialist workers.

- Professional civil liability and accident insurance policies do not always cover this type of work carried out by volunteer workers or are not able to provide medical coverage to participants in the event of on-site accidents caused by inexperience.

- For an initiative like this to succeed these works must be supervised by qualified professionals, guaranteeing the survival of the new construction or good results in a restoration.

Building a dome with curved straw bales with the help of volunteers from multiple countries in Hrubý Šúr, Slovakia
(credits: F. Vegas)

Building a bread domed oven with cob by a group of friends in Valencia, Spain
(credits: authors)

- In these interventions there is a true transmission of knowledge and trades, but it results in poorer quality construction or restoration actions, since they require not only the work of unskilled labourers or helpers, but also, crucially, that of specialists who could compensate for lack of experience of the volunteers.

Final assessment

In hindsight, when examining advantages and disadvantages, positive points and difficulties, this citizen participation action can seem to be positive. Despite the aforementioned risks resulting from inexperience and action on fragile buildings of heritage value, in many cases inaction would result in the loss of traditional trades and a greater lack of knowledge and awareness within society, or the ruin of historic buildings due to a lack of care and investment.

Many of these experiences take place after or during educational courses which, once completed, are accompanied by the relevant certificates or diplomas. Those interested gain experience in this type of construction and repair action, which they can often show to an employer in the form of acquired knowledge, eventually practising the trade, championing the values of community, non-profit and sustainable work, the use of natural and traditional buildings, and respect for heritage and the environment.

In some countries these grassroots movements, especially those of volunteers firmly calling for the defence of heritage, have been awarded recognition and funding by municipal, regional, national or international bodies. These organisations recognise the vast irreplaceable work these movements carry out in a dispersed heritage which, otherwise, would not receive the same care due to administrative or financial difficulties.

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REMPART (FR)

Fernando Vegas, Camilla Mileto
Universitat Politècnica de València, Valencia, Spain

The association Rempart – Chantiers de bénévoles pour le patrimoine, which brings together 180 small associations for the safeguarding of heritage throughout France, offers opportunities to volunteers for restoring the built heritage in France (chapels, castles, houses, lime kilns, wash houses, etc.). Its actions are usually funded by the Ministry of Culture, Youth, Environment and Social Affairs, as well as by local authorities. It places on citizens the role of protecting, restoring and taking responsibility for the common heritage, with the purpose of ensuring its enjoyment by present and future generations. It is not a necessary requisite for volunteers to possess technical restoration skills, although all the projects always have a person in charge with adequate knowledge for managing the work. The interventions carried out by Rempart frequently resort to the recovery and use of the traditional materials and techniques present in the building to be restored, thus contributing to their preservation, dissemination and valorisation not only amongst craftsmen, but also amongst the people participating as volunteers in general. The workshops, usually two-weeks long, are of all types and for all ages, from 8-year old children to elderly citizens. Other activities are also carried out, such as professional education activities, technical courses, conferences, training in trades, etc. Rempart has also drafted educational kits with information sheets on trades, materials, architectural styles, heritage, etc., for archaeology, architecture and carpentry. In this way, Rempart achieves a double objective: to generate awareness amongst the participants regarding a type of protected building, a trade, a material, a building technique, etc., and an occasion to train them for a specific volunteer action or even for their professional life. The Rempart collective also relies on an active group of friends of the association who support its objectives of safeguarding and protecting heritage, contributing financially with annual donations. Since its foundation in 1966, and under the motto "Rempart acts to make heritage everyone's business", it has made it possible to restore 800 heritage sites with the participation of more than 10,000 volunteers. It is also associated with another 50 similar associations located in 30 different countries.

WEB LINK
www.rempart.com

USERS
Citizens, professionals, technicians

VERSUS SUSTAINABILITY PRINCIPLES
3. Reducing pollution
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
11. Supporting autonomy
12. Promoting local activities
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources
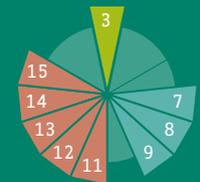
Construction and ignition of several gypsum mini-kilns during the Colloque international – *Le plâtre en construction*, organised by Rempart in February, 2019 at the Bergerie Nationale de Rambouillet

Demonstration of formwork construction with stone and gypsum filling. Colloque international – *Le plâtre en construction*, organised by Rempart in February, 2019 at the Bergerie Nationale de Rambouillet

(credits: Vincenzina La Spina)

EUROPEAN HERITAGE VOLUNTEERS

Valentina Cristini
Universitat Politècnica de València, Valencia, Spain

European Heritage Volunteers has been active in the field of heritage-related education and volunteering for heritage for over twenty-five years. Its main objective is to provide a platform that reaches out to heritage sites which are in need of support or visibility, while at the same time addressing the gap in opportunities for young heritage professionals aiming to gain practical skills to complement their academic education and wishing to contribute to the rescue, conservation or revitalisation of heritage sites.

The European Heritage Volunteers Programme implements every year over thirty training courses and volunteering projects across the broader European cultural space. The programme is aimed at students of heritage-related fields, young heritage professionals and heritage enthusiasts who want to obtain a comprehensive understanding regarding various heritage-related aspects such as traditional techniques and crafts, conservation and restoration practices, and heritage documentation and interpretation. The topics addressed reflect the needs of the specific heritage site and of the local partners as well as the diversity of European cultural heritage, ranging from rescue measures and conservation interventions, to archaeology, restoration of artefacts, archival work or climate resilience strategies at historical parks and gardens. The courses and projects are led by technical instructors specialised in their respective fields and facilitated by a team of trained group coordinators.

European Heritage Volunteers is based on a wide European network of partners that connects the expertise of heritage professionals with the engagement of civil society activists. It provides trend-setting educational experiences that enable a look at heritage in the context of its history, present use and future development, while bringing multiple benefits and new motivation to community involvement and local empowerment.

WEB LINK
www.heritagevolunteers.eu

USERS
Students of heritage-related fields, young heritage professionals and heritage enthusiasts

VERSUS SUSTAINABILITY PRINCIPLES
3. Reducing pollution
5. Reducing disaster risks
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
12. Promoting local activities
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources
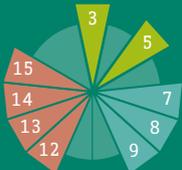
➔
European Heritage Training Course "Architectural documentation of traditional wooden architecture" at Kozichkovi Houses in Kotel / Bulgaria

European Heritage Training Course *Conservation & Restoration of frescos* at Capela de São Brás in Portel / Portugal

(credits: European Heritage Volunteers)

COB IN LOWER NORMANDY, FRANCE

François Streiff

Architect in charge of earth and eco-construction at the Parc naturel régional des Marais du Cotentin et du Bessin, France

The *Parc naturel régional des Marais du Cotentin et du Bessin* in north-western France preserves an earthen architectural heritage specific to this region: cob construction. This technique, which consists of shaping walls with a stack of clods of earth, fibres and water, is an authentic lesson of simplicity in the present context. Although the contemporary use of cob is very rare, this technique is still very present in the landscape, with some villages having 80% of their heritage built this way. This exceptional concentration of cob buildings shapes the landscape of the region and has led the Park to embark in the preservation of this architecture. As is often the case in rural areas, the evolution of agricultural practices has led to the abandonment or transformation of many buildings. In addition, post-war reconstruction policies based on the use of standardised industrial materials put an end to the use of the earth and the loss of know-how.

Since the creation of the Park in 1991, training for professionals, awareness-raising and financial support for public and private owners have helped to structure the rehabilitation of this heritage. Pilot public rehabilitation projects were set up to develop affordable technical solutions adapted to the skills of craftspeople and to the materials available locally, and their costs were compared to the conventional solutions of the time. Financial aid was then provided by the Park on the basis of technical specifications provided initially by the CAUE, a public entity responsible for urban planning and architecture, and later directly by the architect of the Park, to encourage owners to start work and support the sector. Publications, open days, site visits and festivals have helped to stimulate the revival of a technique that had been sidelined for almost half a century.

Twenty years after the first pilot operations, nearly 600 buildings have been renovated, helping to structure and strengthen the sector. A support system for self-rehabilitation called 'Enerterre' was also set up for house owners in a situation of energy poverty.

Aware of the fragility of this sector, the park is now committed to perpetuating the transmission of knowledge. All the training institutions, including masonry schools, but also architecture and engineering schools, are now trained in this ancestral technique. Research and development projects are also underway, including a European project with England (CobBauge Project) to breathe new life into cob building and encourage the emergence of a contemporary energy-efficient architecture inspired by the intelligence of the past.

WEB LINK
www.parc-cotentin-bessin.fr
www.cobbauge.eu

USERS
Professionals, public and private owners

VERSUS SUSTAINABILITY PRINCIPLES
3. Reducing pollution
5. Reducing disaster risks
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
11. Supporting autonomy
12. Promoting local activities
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

← Pictures of rehabilitated cob constructions, France
(credits: *F. Streiff)*

GAMIFICATION FOR COMMUNITY ENGAGEMENT IN HERITAGE AND SUSTAINABILITY

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Università degli Studi di Firenze, Florence, Italy

Gamification refers to the application of game design elements and mechanics in non-game contexts to engage and motivate users: serious games, urban games, and pervasive games are alternative terms for games that facilitate the understanding, exploration, and awareness of heritage by integrating direct on-ground experiences with digital technologies to expand user knowledge and interaction.

When applied to cultural heritage, gamification can enhance the preservation, accessibility, and appreciation of cultural landscapes, sites, buildings, and traditional knowledge. Gamification can promote social interaction and foster a sense of community among individuals interested in cultural heritage. Users can share their achievements, experiences, and discoveries, further encouraging others to participate.

Digital and virtual games appeal to younger generations who are often more comfortable with digital technology. By using gamified platforms, cultural heritage can reach a broader and more diverse audience, ensuring its preservation for future generations.

Gamified experiences can make learning about cultural heritage more interactive and enjoyable. Users can engage with historical events, artefacts, and stories through games, quizzes, and challenges, making the learning process more immersive and memorable.

Introduction

The video game market generated 92.3 billion Dollars in 2022, and analysts predict it will continue to grow over the coming years (Newzoo, 2023). This figure, which in itself is not surprising – the human appetite for digital games has been well known for quite some time (Platania, 2017) –, acquires a special relevance from the moment that the governments of many countries, and therefore no longer only the private sector, have understood its importance; in Italy, for example, the introduction of a tax credit for the production of video games has represented a major incentive for the growth of this industry, while also confirming that video games can be a very useful tool for developing digital literacy, transversal competencies and creative thought in students (Saletta, 2022; Cantoia, 2022).

Within the so-called mobile network society, characterised by ubiquitous and potentially perpetual connections mediated by devices and made possible by platforms, that distinguishes the way in which man relates to the world today (Zurovac, 2015), also video games have evolved in order to use the net to connect players with each other. Social gaming, in fact, makes it possible for people not only to have fun, but also to interact with other users, thus contributing to ascribe an important social function to video games

(Rossi, 2009). The most recent frontier of this development is the possibility of using the Metaverse as a 3D on-line environment for playing games, as well as for socialising, working together, etc. (Chia et al., 2023).

An attempt to classify video games is therefore more difficult than ever, especially due to the speed with which products belonging to different genres hybridise with each other.

The use of the net, which allows developers to have multiple players interact simultaneously within the same video game, has undoubtedly disrupted the traditional player vs. device or player vs. player interaction (in this case both simultaneously present in the same place and connected to the same console), that had characterised video gaming until the Eighties.

A first macro-differentiation thus regards the modes of play, which can involve a single player (Single Player Games – SPs), or else several players connected online (Massively Multiplayer Online Games - MMOs).

This classification can be followed by another related to the main three categories of games: those in which action dominates, where the user generally acts in the first person, those in which the creative aspect prevails, and finally those in which strategy is predominant. The first two types (action and creativity) are those that are more successful among MMOs; an example of this type are MOBAs (Multiplayer Online Battle Arena), which are characterised by competitions between groups of players and are especially widespread today (such as eSports).

Main categories of games
(credits: CHM_Lab)

MODE	FEATURES	EXAMPLE
SP (Single Player)	Action	FPS (First Person Shooter)
	Strategy	RTS (Real Time Strategy)
	Creativity	RPG (Role-Playing Games)
MMO (Massively Multiplayer Online)	Action	MMOFPS
	Creativity	MMORPG
MOBA (Multiplayer Online Battle Arena)	Action, Competition	MOBAFPS
	Creativity, Competition	MOBARPG

In recent years, there has been an increase of a new category of games, that, while maintaining a playful purpose, embraces educational objectives.

Video games of the category generally known as Serious Games (Tan, Nurul-Asna, 2023), include Simulation Games (for practising operations that would involve risks in real life), Exercise Games (for carrying out physical-motor activities), and Educational Games (for learning certain concepts or developing specific skills). The latter are of particular interest, since they are increasingly being integrated within Game-based Learning (GBL) methods in schools of all levels.

Educational Games also play a fundamental role in the knowledge, valorisation and promotion of Cultural Heritage, both tangible and intangible (Pescarin, 2020).

⬅
Pienza under construction: **planning game developed under the EU project 3DPAST**
(credits: authors)

Games for Cultural Heritage Enhancement and Sustainability

Cultural Heritage can be represented in games in many forms: from the setting, sometimes depicted with a high level of realism, of events that are unrelated to the proposed scenarios, through the recreation of events that actually happened (or are presumed to have happened) which then become part of the dynamics of the game, to the interaction between players and objects belonging to past eras (such as those contained in museums).

The real world, whether present-day natural landscapes or the archaeological remains of the cities of our past, has proven to arouse the interest of players as much, if not actually more, than fictional ones.

From this perspective, the processes of documentation and digital restitution of the Cultural Heritage, using methods and techniques (usually structure from motion) which allow the data produced to be usable within game engines, take on a fundamental role.

The products that derive from them are often excellent from a philological, anthropological and historical perspective, as well as from the game-playing point of view, thanks to the close contact with the world of culture and of cultural institutions, both during the development of the story development and other subsequent phases, such as the construction of the settings and 3D models, etc., which determine its success. Below is a non-exhaustive list of the main types of games that can encourage heritage enhancement and awareness of sustainability issues.

• *City-building and Planning Games.* Players are encouraged to build or rebuild cities or settlements, choosing resources, materials, times, or forms. To foster awareness of heritage and sustainability, the players should consider the preservation of cultural landmarks or incorporate sustainable practices in their virtual cities. This can raise awareness about the impact of urban development on heritage and the environment.

- *Virtual Tours and Augmented Reality*. AR technology can be used to overlay historical information and stories on real-world locations. Players can use their smartphones or AR goggles to immerse themselves in the past and learn about the heritage of their surroundings. Through VR and AR, users can explore cultural sites and historical locations virtually, bridging the gap between the past and present and enhancing their understanding of historical contexts.

- *Scavenger Hunts, Challenges and Geocaching*. Players can explore their surroundings and discover cultural landmarks, historical sites, or hidden treasures. Digital quests can lead participants to discover historical sites and landmarks in their communities, encouraging appreciation of the local cultural heritage. Apps or games that use geolocation can guide users through heritage sites, thus making cultural heritage more accessible to a wider audience. Competitions and challenges can inspire community members to generate new cultural preservation and sustainability ideas, encouraging innovation and teamwork.

- *Pervasive games*. They use various media, technologies, and physical locations to immerse players, allowing them to interact with their real-world environment, with objects, and/or other players. Some pervasive games use AR technology to overlay virtual elements onto the real world. Many of them encourage collaboration and social interaction among players to solve puzzles or challenges.

- *Sustainability Simulations*. Design simulations that allow players to experience the consequences of their decisions on the environment and cultural heritage. This can promote a better understanding of the importance of sustainable practices.

- *Community Storytelling and Role-Playing*. Create platforms or games that allow community members to share personal stories and memories related to cultural heritage and sustainability. This can strengthen the sense of community and shared identity. Interactive storytelling experiences allow users to foster empathy and deeper connections to historical events, making them more relatable and meaningful.

- *Data Collection and Crowdsourcing*. Gamification can be employed to collect data and to crowdsource information related to cultural heritage. For example, users can contribute by identifying historical locations in old photographs or transcribing historical documents.

Conclusions

Gamification can be a powerful and effective way to raise awareness, educate, and involve people in preserving cultural heritage and promoting sustainable practices. It offers a creative and engaging approach to enhancing cultural heritage by leveraging the power of technology and interactivity. By incorporating game elements, cultural institutions, educators, and communities, it can make cultural heritage more accessible, enjoyable, and relevant to a wider audience, ultimately fostering a deeper appreciation for our shared history and traditions. Through interactive and enjoyable experiences, people are more likely to take an active role in preserving their cultural legacy and making sustainable choices for the future.

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CALASETTA HERITAGE GAMES

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WEB LINK
www.linktr.ee/calasetta_games

USERS
General public

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
9. Recognising intangible values
10. Encouraging social cohesion
11. Supporting autonomy

➜
Front and back of the postcards with QR code produced for each game
(credits: UNIFI students)

Calasetta heritage games is a set of games based on the cultural heritage of the town of Calasetta as part of the a joint workshop organised by the Department of Architecture of the University of Florence and the Department of Civil and Environmental Engineering and Architecture of the Univeristy of Cagliari. During an intensive one-week residential game-design workshop, more than 20 student from both departments immersed themselves in various areas of the local cultural heritage; first of all to understand it, but also to transmit it through a digital platform that allows the wide public to discover, through the game, the various values of the local vernacular heritage. With the guidance of teachers and tutors dedicated to cultural heritage, architectural survey, game design and narrative, the students structured a story, carried out interviews and developed a graphic design, which included taking photographs and videos to create the games on a special platform for this propose. The story of each game was developed by the students themselves around four lines of vernacular heritage: cultural landscape, living with the sea, living heritage and urban morphology.

The *cultural landscape* game is about life in the countryside. Beginning with the aim of helping Ginevra, the main character, to build her grandparents' traditional Baracca, the player discovers all 15 *VerSus* sustainability principles that apply to the cultural landscape of Calasetta. The *living with the sea* game is about different crafts related to the sea, such as the boat builder and the fisherman; the objective of the game is to help Nazario repair the damaged boat using the traditional techniques of the shipwright. The *living heritage* game is about intangible traditions, and has the aim of discovering, saving and spreading the intangible cultural heritage of Calasetta which is at risk because it is gradually disappearing. Explore the city through gastronomic traditions, agriculture, the local Tabarchian language, viticulture and crafts. The *urban morphology* game consists in walking around the city and recognising its morphology by helping the mother of an unknown soldier to reconstruct the story of her son and find the place where he was buried by venturing through the streets of Calasetta. All these games are available to be played online by anyone who visits Calasetta, since they are created to be played in-situ as a tool for discovering the diversity of the cultural heritage of the territory.
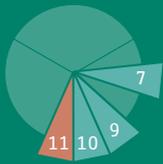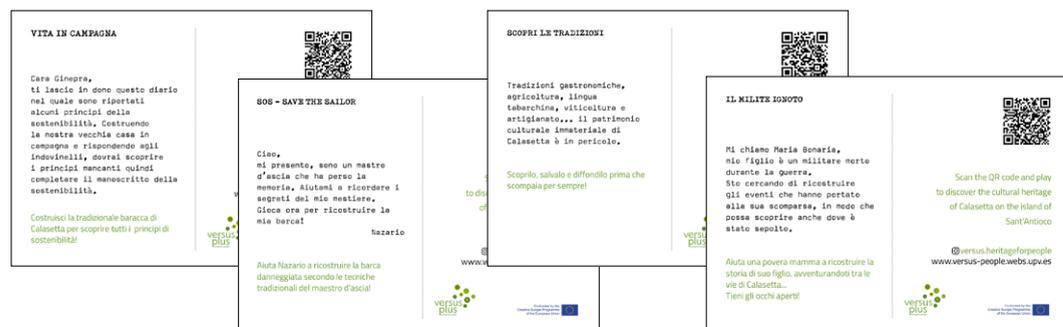
ARTISANS TO THE RESCUE

Davide Leone
U' Game, Palermo, Italy

It was 2015 and we were about to conclude a project on the artisans of Palermo. In the project, we had met more than 50 artisan workshops and felt the need to share the wealth of relationships and narratives that we had collected.

For this reason, we decided to create an urban game. We did not know this at the time but it would be the beginning of U'Game, a cooperative which since then has produced more than 70 gaming experiences involving a total of 15000 people between players and interactions.

The game we developed is called *Artigiani alla Riscossa*, or *Artisans to the Rescue*, and was designed above all to generate a deep interaction between players and artisans.

The game is structured in a series of tests that are divided into 6 different areas: observation tests; construction tests; interaction tests; collective tests; anecdote tests; and adventure trials.

This set of tests is the foundation upon which most of the urban games developed by U'Game have been built.

Observation tests connect with the physical world and are structured so as to bring players to a place and point out particular details to them. In this way, you can ask the players to reach a certain square and pay attention to some details, or you can take them to visit a specific workshop, in order to point out interesting elements.

Construction tests are unique interaction trials in which players are asked to build objects. In the game in question, the players are asked to find a craftspeople who is willing to build together with them an object related to food.

Interaction tests encourage the interaction between players and citizens or, in this case, with craftspeople. For example, the players were asked to try to sell an object produced by a craftsperson of their choice. Another very interesting interaction test was that of the 'hostage' in which teams received an object produced by a craftsperson and had to bring it back to him/her.

The collective tests are aimed at making the game visible to the city and are carried out in the form of flash mobs which highlight the themes narrated by the project.

The anecdote tests serve the purpose of revealing news and anecdotes regarding the theme of the game to the players.

The adventure trials are site-specific games that offer a complex interaction. In particular, they are divided into an ordered series of observations that lead to the resolution of an enigma.

More than 100 people participated in the game, which was the first of a series of great successes in the games developed and organised by U'Game.

Social media promotion of the game *Artigiani alla Riscossa*

THE SEVEN FAMILIES OF FORMENTERA

Nuria Sánchez Muñoz
CRAterre, Grenoble, France

This pedagogical activity is based on the famous card game *The Seven Families*, in which each family represents a prototypical culture in the world (Tyrolean, Chinese, Arab, Bantu, etc.) and is made up of six members of the same family (grandfather, grandmother, mother, father, son and daughter). The educational game is created by making a parallelism between the cultural families and the landscape units of Formentera, each of them characterised by a vernacular architecture. Each family is integrated by six approximation scales: from the landscape unit to one of its plots, from a vernacular architecture to one of its construction elements, and from one of the materials used in the element to the source of this material, which takes us back to the natural landscape of the island. For instance, the first landscape unit is *Promontorio de la Mola*, at the south-east end of Formentera. This family is represented by the *Old Mill of Mola*, with the focus given to the mill's roof, and more particularly to its thatching. The family ends with a card that explains the origin of the reeds with which this thatching was made. By playing, it is easy to comprehend that the Formentera builders found whatever they needed within this island that is so full of resources.

To build this game, no huge or expensive elements are required. Instead, it is essential to start with a complete documentation of the heritage to be presented. Once this information is processed and simplified, the logic of the game is accessible to all kinds of audiences. It was used for the first time at the *VerSus* Festival of Formentera in 2023, where it could be played by all kinds of people, although many of them had never heard of this game before.

More than having an enjoyable time or learning about the Island heritage, the final objective of this game is to help understand the inseparable bond that exists between vernacular architecture and its environment, the deep link between nature and culture. It is a fun way for everyone to understand the ideas and ethics needed to build a sustainable future.

USERS
All publics

VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
2. Taking benefit from natural and climatic resources
3. Reducing pollution
5. Reducing disaster risks
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
9. Recognising intangible values
10. Encouraging social cohesion
11. Supporting autonomy
14. Extending lifetime
15. Saving resources efforts

➜
People playing the Seven Families of Formentera game during the *VerSus* festival

(credits: N. Sánchez Muñoz, L. Dipasquale)

CONTAHISTORIA

Camilla Mileto, Fernando Vegas, Marina Elia
Universitat Politècnica de València, Valencia, Spain

The *CONTAHISTORIA*, or 'history-telling' game was the result of the cooperation between the Universitat Politècnica de València and La Petita Figuera, in the framework of the *Versus+ / Heritage for PEOPLE* project. Jessica, who is an artisan from Formentera and the founder of La Petita Figuera, makes handmade wooden toys and games, one at a time, using natural woods from forest felling and pruning or carpentry waste, thus promoting the responsible consumption of wood. *CONTAHISTORIA* is an educational game devised for children from the age of 5, inspired on the island and the vernacular heritage, hand-made in natural wood. It consists of different panels with a feature of the island on each (a lighthouse, church, cistern, etc.) and a bag containing various slide rulers for each number. The slide rulers are aimed to help the children learn the concept of number, which is also known as 'colour number'. They come in different colours depending on their length: the cube has a side equivalent to 1 and represents the unit, the others are multiples. The game consists in finding the slide rule that fits each side of the drawing or a combination of them, thus promoting the knowledge of quantities in numbers, opening a path toward the mathematical operations of adding and subtracting, and focusing the attention of the child on the different possibilities of numerical combinations. Furthermore, as he or she is learning about numbers, with each panel the child gets to know and become familiar with the features of the island of Formentera: lighthouses, mills, churches, etc., since every drawing is accompanied by a brief description. On an island where the economy is predominantly based on seasonal tourism-related activities, this type of game promotes knowledge and appreciation of the traditional architectural heritage which is so important in terms of the cultural identity of the island. Through play, the child discovers the existence of singular architectural elements on the island, both monumental and public or humble and vernacular ones, and this discovery contributes to raising awareness from an early age regarding the need for their preservation as part of the built cultural heritage of the island.
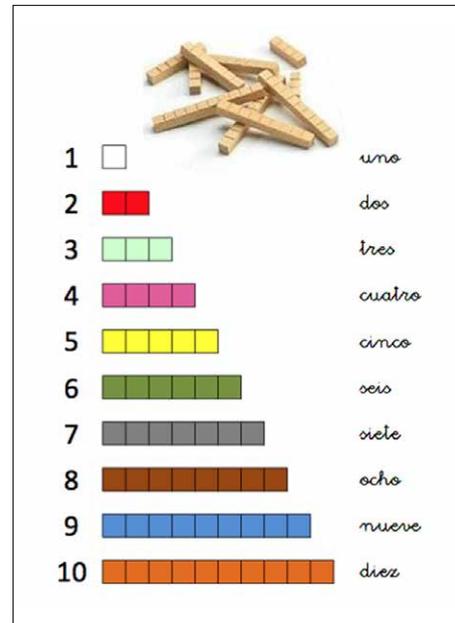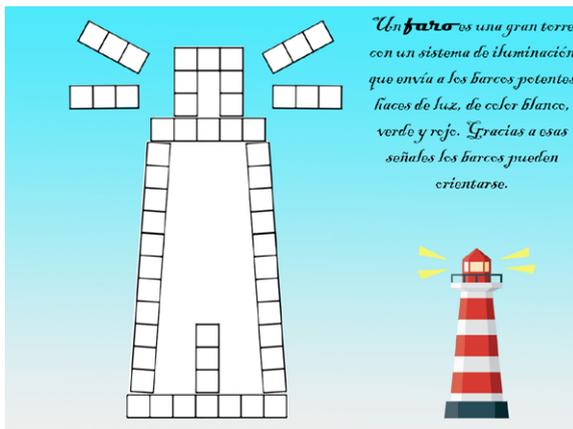
DESIGNER
Jessica y La Petit Figuera
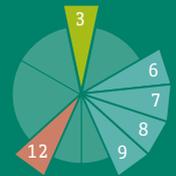
USERS
Children from 5 years old

VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
3. Reducing pollution
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
12. Promoting local activities

Panel of the game showing the lighthouse. It is one of the main features of the island

Strategies for the management and dissemination of traditional knowledge for a sustainable future

1 CONSERVATION AND DESIGN

2 EDUCATION STRATEGIES

3 COMMUNITY ENGAGEMENT

4 KNOWLEDGE MANAGEMENT AND DISSEMINATION

DOCUMENTING AND SAFEGUARDING INTANGIBLE HERITAGE

DOCUMENTATION AND DIGITAL SURVEY OF TANGIBLE HERITAGE

MANAGING VERNACULAR KNOWLEDGE FOR BUILDERS AND ARCHITECTS

SHARING KNOWLEDGE WITH A WIDE PUBLIC

KNOWLEDGE MANAGEMENT AND DISSEMINATION

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Vernacular knowledge represents the accumulated experience, wisdom and know-how shared by a given society or community of people, which have evolved over many generations within their particular ecosystem (Magni, 2016). Also called local, or traditional knowledge, it is a type of non-academic, practical and contextualised knowledge, which defines the social and natural relationships of a community with its environment.

Scientific knowledge, in its Western meaning, is distinguished from vernacular and local knowledge by its attributes of universality and objectivity. It is systematised in written records, and this allows it to reach a wider diffusion. Vernacular or local knowledge includes also the practical, the empirical, the sacred and the intuitive; it is generally tested over a long period of time and reinforced through processes of trial and error. Local knowledge dynamically uses communication channels that are not necessarily structured, such as oral communication or direct observation and is therefore seldom documented. This type of knowledge includes the entire cultural context in an interdisciplinary way, in fact the traditional community manages its natural context as a complete system where the various components interact with each other (Tharakan, 2015): from aspects related to living and building, to those related to land management, the production of food and the exchange of goods, to aspects related to social and cultural life, and well-being in general. Traditional knowledge governs the relationship between humans and what are known as ecosystem services, that is, the many and varied human benefits provided by the natural environment and healthy ecosystems (Everard, 2021). Hence, it is evident how the safeguard and transmission of traditional knowledge can make a formidable contribution towards sustainable development that reduces negative impacts on the environment and integrates in a balanced manner with the context.

Ikujiro Nonaka (1994) distinguishes tacit knowledge, which is difficult to formalise and communicate, from explicit knowledge, in other words knowledge which is transmissible through a formal and codified language.
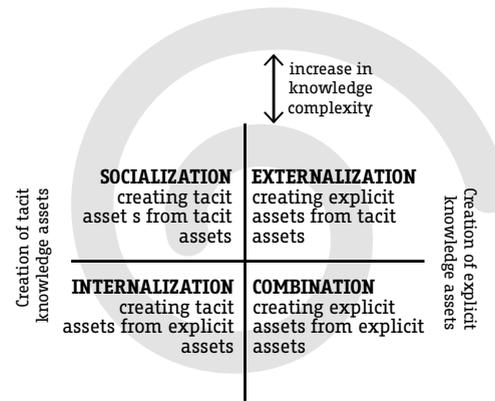
Tacit knowledge is deeply rooted in the actions and thoughts of an individual in a specific context; it will therefore be made up partly of technical skills and partly of mental models, beliefs and perspectives which have become so settled that they are taken for granted and cannot be easily expressed. Explicit knowledge, on the other hand, is connoted in order to be easily expressed, captured, stored and reused, to be transmitted through databases, books, manuals and messages.

opposite page
European Heritage Training Course "Architectural documentation of traditional wooden architecture" at Kozichkovi Houses in Kotel, Bulgaria
(credits: European Heritage Volunteers)

➡ **SECI Model of Dynamic Knowledge Creation.**
(Adapted from: Nonaka, 1995)

increase in knowledge complexity

Creation of tacit knowledge assets

Creation of explicit knowledge assets

SOCIALIZATION
creating tacit asset s from tacit assets

EXTERNALIZATION
creating explicit assets from tacit assets

INTERNALIZATION
creating tacit assets from explicit assets

COMBINATION
creating explicit assets from explicit assets

However, tacit and explicit knowledge are not separate entities, but rather interact in a mutually complementary manner in the cognitive activities of human beings. Nonaka and Takeuchi (1995) explain the interaction between these two types of knowledge through the SECI model, which has become the cornerstone of knowledge creation and transfer theory (Hoe, 2006). They proposed four ways in which knowledge types can be combined and converted.

- *Socialisation*: Tacit to tacit. Transfer of tacit knowledge between individuals through observation, imitation, experience, practice.
- *Externalisation*: Tacit to explicit. This is deemed as an especially difficult and often particularly important conversion mechanism to translate tacit knowledge into documents, manuals or procedures. The use of metaphors or analogies are cited as important externalisation mechanisms.
- *Combination*: Explicit to explicit. This is the simplest form. Codified knowledge sources (documents, for example) are combined to create new knowledge.
- *Internalisation*: Explicit to tacit. As explicit sources are used and learned, the knowledge is internalised, modifying the existing tacit knowledge of the user.

The methods through which the transfer of tacit local knowledge take place are usually the so-called 'horizontal'" methods. They are strongly oriented to learning by doing, through twinning, apprenticeship, travel, imitation, and mutual training between different experts. 'Vertical' tools are used instead when the knowledge is encoded and made accessible. Vertical methods are those commonly used in teaching lessons where the process of learning takes place following a hierarchical relationship.

In the processes of management and safeguarding of traditional knowledge, the involvement of the community is crucial: the community preserves knowledge through socialisation processes and enables its externalisation through the application of documentation and transmission strategies. When effective strategies and practices of management, dissemination and sharing exist, the community guarantees the processes of combination and internalisation.

Finally, the application of vernacular knowledge management and dissemination strategies can generate a positive return on the community, helping it to empower and promote sustainable incomes while reaffirming the value of their heritage both within and outside their communities.

With the advent of modernity and the industrial revolution, communities characterised by a system of relationships based on local knowledge have undergone an inevitable evolution. New materials, building processes, needs and ways of living have taken over, and gradually many of the principles and know-

how of traditional communities have been lost or have been deliberately abandoned. These include traditional knowledge about ways of conceiving and managing landscape, cities and buildings. The importance of safeguarding such knowledge lies not in wanting to reintroduce outdated patterns of living, but in understanding, by looking at the lessons of the past, how we can rediscover a deeper connection between the changing needs of our habitats and the environmental, social and cultural context in which our lives are framed. This issue is critical today, not only for addressing the challenges imposed by climate change and the scarcity of resources, but also for countering growing social distress, which is due in part to the widespread phenomena of the disintegration of relationships among members of a community, the loss of cultural identity, and the breakdown of the cooperative relationship between a community and the ecosystem in which it is embedded.

This chapter aims to investigate the more successful strategies to safeguard and transmit vernacular knowledge supporting sustainable development. The knowledge that we discuss concerns both tangible aspects (buildings, settlements, construction techniques) and intangible aspects, in other words the complex system of know-how that has shaped the tangible heritage and enabled its preservation over time. The chapter investigates strategies and tools for the documentation, transmission and management of traditional knowledge aimed at technicians and stakeholders, as well as strategies for its dissemination to the general public. Throughout the chapter we highlight how the digital transition has led to innovation in knowledge management methods and processes that are increasingly efficient, encouraging preservation and enhancement and enabling new markets and audiences to be reached.

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DOCUMENTING AND SAFEGUARDING INTANGIBLE HERITAGE

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Intangible cultural heritage as resource for sustainable development

Intangible cultural heritage refers to the knowledge, practices and expressions shared by communities around the world. The value of intangible cultural heritage is due not only to the cultural manifestation itself, but also to the wealth of knowledge, skills and know-how that are passed down through it from generation to generation (UNESCO, 2003), which also allows the preservation of tangible heritage. The safeguarding of intangible heritage helps to sustain cultural diversity in the face of increasing globalisation, and to strengthen the sense of identity and belonging that contributes to a community's well-being (UNESCO, 2003; UNESCO, 2021)

The Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO, 2003) identifies 5 areas for the classification of intangible cultural heritage: a) traditions and oral expressions, including language as a vehicle of intangible cultural heritage; b) performing arts; c) social practices, rituals and festive events; d) knowledge and practices concerning nature and the universe; e) traditional crafts (UNESCO, 2003).

In the context of this research, we mainly analysed the intangible heritage related to vernacular architecture, and thus the know-how and skills related to building practices, which are linked to a profound knowledge of nature and the socio-cultural context.

The knowledge of traditional building craftsmanship is crucial since it constitutes an essential part of the identity of the architectural heritage, yet at the same time it also represents the technical thinking of a human group in a space-time interval, and is a vehicle for learning the processes of adaptation that have allowed for the establishment of a skillful relationship with the environment.

However, knowing how to build is also profoundly connected to the knowledge and practices concerning nature and the universe, and in a broader sense to all the other categories mentioned by the Convention, since together they constitute that vision of the world shared by a traditional community, in which culture, nature and social well-being interact with each other in a balanced and sustainable manner. Therefore, the safeguarding and transmission of the components of intangible cultural heritage in a systemic way is crucial for the sustainable development of the habitat, as it can provide useful insights for local approaches to the sustainable management of natural resources, prevention of soil erosion or natural disasters, ensuring well-being, protecting biodiversity and building resilience.

opposite page
Master Ali making a mud brick vault without centering for a group of students in Esfahak, South Khorasan Region, Iran

(credits: E.P. Ferrari)

The transmission of tacit knowledge and traditional crafts

Before discussing knowledge related to traditional craftsmanship, it is necessary to introduce the topic considering how knowledge is classified according to Western epistemology, which divides it into three main kinds (Pavese, 2021): propositional knowledge or *know-that*, acquaintance knowledge or *know-by acquaintance*, and procedural knowledge or *know-how*. Intangible cultural heritage can be largely ascribed to forms of *know-how*. The *know-how* that is at the base of several valuable traditional crafts is commonly transmitted through apprenticeship and from person to person. In this sense, it should be reminded that traditional crafts have always undergone a process of transformation and adaptation, not being static entities. In fact, culture (and knowledge) is an on-going and dynamic process bound to the ever-changing world (Harris, 2007). Traditional crafts and their related knowledge are dependent on transmission practices (such as apprenticeship) and environments of practice where skills can be trained, learned and techniques can be refined and adapted, and sometimes even changed. This has been the way (generally outside formal contexts) to preserve and continue the dynamic transformation of traditional know-how.

Nevertheless, it might seem subversive in a society that considers normal to account for all knowledge in written forms, to actually discover that not all knowledge can be subjected to explicit codification (Gascoigne, Thornton, 2013). Polanyi and many other philosophers of science have long debated the necessity to recognise that much knowledge is *tacit*, therefore untellable, non-codifiable and not in-

dependent from a context (Polanyi, 1958; Polanyi, 1966; Gascoigne, Thornton, 2013). On the other hand, we also have forms of *explicit knowledge*, which can be expressed in a propositional form (verbal, linguistic, symbolic, etc.) and that can be codified and context-free. This distinction poses a challenge for the documentation of cultural manifestations that cannot simply 'be captured' by words or formulas. In any case, the importance of this distinction stands in the fact that even if *tacit knowledge* cannot be carved out into words or codified in other forms, it can be 'thought with' in the realm of performance-based knowledge (Marchand, 2003). Avoiding the intellectualistic reductionism which considers all forms of knowledge to be codifiable, as well as an opposed point of view that pessimistically considers whatever is *tacit* to be ineffable, we should recognise, however, that *tacit knowledge* cannot be codified in context-independent general terms, but that it can nevertheless be articulated (Gascoigne, Thornton, 2013). Articulation of *tacit knowledge* is dependent on two elements: context and person (craftspeople), thus articulation is possible by being present as a skilled person applies his or her knowledge in a specific context. It is for this reason that not only in the past, but even today, most of the knowledge intended as intangible cultural heritage is taught and learned from person to person, and in many years of practical experience in specific contexts of practice.

The challenges of documenting intangible heritage: methods and tools

Researchers have a tool-kit at their disposal for the recording of all those aspects of intangible heritage that can be articulated into propositional and codified forms (written, visual, symbolic). Methodologies can be borrowed from different fields and the ones mentioned here are mainly derived from an ethno-anthropological approach. Interviews are one of the main tools employed for data that can be converted into text. They can be written manually in a note-book or also audio- or video-recorded to be later transcribed. Interviews (structured, semi-structured and unstructured) are not only a useful tool to collect data of various nature, but are also a way to personally get to know research participants and establish mutual trust. Direct observation of practices supported by photographs and video-recordings are powerful tools that can provide us with a great amount of data. Recording data in this way can produce written and visual material alike, since we can extract information based on different criteria and depending what we wish to focus on. As a result of both these methods we can also use symbolic language and abstract representation such as diagrams or figures to present our findings. Audio-recordings and sounds can also be a form of valuable data for research on traditional crafts.

Nevertheless, the documentation of intangible cultural heritage often poses great challenges, especially when it comes to 'grasping' the qualities of tacit knowledge. As we have seen in the previous section, what is *tacit* cannot be recorded with words nor codified through symbols. As a first instance, any documentation of this kind should acknowledge that not all aspects of traditional crafts can be recorded. The 'essence' of any form of know-how can only be grasped through direct learning and practice. Regarding this challenge, some anthropologists have called to attention the interesting possibilities

➡️
Syrian master builder (*maâlem*) explaining the construction technique of corbelled domes, Syria (2009)
(credits: L. Dipasquale)

offered by ethnography as a research method[1]. Ethnographic work is mostly based on participant observation, which means spending protracted periods of time (months or years) engaging with research participant. In this way, the researcher is able to analyse at a deeper level the subject matter of their work. When this methodology is applied to traditional crafts, it can also be combined with apprenticeship, an approach known as 'apprentice-style ethnography' (Marchand, 2001 and 2009; Downey, 2010; Downey et al., 2015). This approach utilises a practical strategy so that the researcher is not only intellectually, but also physically involved in the learning process of the subject. The protracted experience within a context of practice with experts allows the researcher to gain not only information and facts about the subject of study (know-that), but also hands-on and embodied knowledge (know-how). In fact, this experience is not only limited to observation and recording from the outside, but includes being cognitively involved at multiple levels. In this way, a study of crafts with craftspeople allows the researcher to include the experts into the research process, as they become co-creators in the work. A privileged access to craftspeople practices and experience is offered through the physical contribution of the researcher, and this is achieved with an exchange of 'toil' for 'ethnographic knowledge' as well as craft skill (Marchand, 2008). As anthropologist Paul Sillitoe points out "no amount of reading subjec-

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[1] Trevor Marchand's seminal contribution on architecture, crafts and anthropology is of great relevance in this respect. What we can learn from his research is that different types of construction work (from masonry to carpentry), like other skilled physical activities, are exchanged, understood and negotiated between practitioners mostly without the use of words, since learning is achieved primarily through observation, imitation and repetition, while the use of propositional instruction is primarily aimed to communicate, focus, and coordinate these activities (Marchand, 2008).

tive reflections will enable you to know what it is to plaster a ceiling or to build a brick wall", therefore "you have to do it to know it" (2017). Being aware of this factor is very helpful to guide researchers in the field of crafts, in particular building crafts, to expand their research tool-kit and methodologies. At the same time for architects, the application of these methods in their research projects ensures new insights as well as a more profound knowledge which goes beyond merely abstract notions.

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RÀIXE: DIGITAL SPACES FOR TABARKAN CULTURE

Marzia Varaldo

Associazione Culturale Millepiedi, Cagliari, Italy
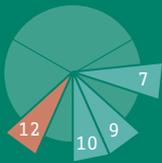
Ràixe – Digital Spaces for Tabarkan Culture is an innovative multimedia museum installation based on the digital archive of the Tabarkan Culture.

It represents a Host Tourism System which involves an innovative collection of materials, and aims to narrate, enhance and promote the cultural heritage of Tabarkan Culture through the recovery of the shared ancient roots (*ràixe*, in Tabarkan) of its five communities: Tabarka (Tunisia), Nueva Tabarca (Spain), Genova Pegli, Carloforte and Calasetta (Italy).

The Ràixe digital archive in fact narrates the journey and history of the Tabarkan people who left Genoa Pegli in 1538 to establish a community in Tabarka, Tunisia. Later communities were founded at Carloforte (1738), Nueva Tabarka (1758) and finally Calasetta (1770). The Tabarkan language, currently spoken only in Calasetta and Carloforte, is the distinguishing feature of this adventurous history.

The itinerary of the exhibition develops on two levels of the structure. The narrative of the journey of the Tabarkan people begins on the ground floor, with the use of descriptive rotating panels that present the history of this people in a historical and chronological order. On the first floor, other exhibition panels describe the local material culture: the cycle of the year, the cycle of life, the crafts and typical activities of the Tabarkan communities in Calasetta and Carloforte.

Cut-outs representing crafts and typical activities enhance the installation, and the specific features of the typical Tabarkan trades are narrated with the use of QR codes.

The 20 descriptive panels and character cut-outs - with the aid of QR code-reading tablets – allow visitors to read or listen in five languages to the story of the journey of the Tabarkan people, to learn about their customs, crafts and traditions. A touch-screen table, which collects videos, photos, ancient documents and historical maps, lies at the core of the digital archive. At the end of the itinerary at the Ràixe archive-museum, it is possible to see the documentary video, approximately 20 minutes long, *In viaggio con i tabarchini*, which narrates the story of the Tabarkan people.

➡ Interactive panels of the exhibition at *Ràixe – Digital Spaces for Tabarkan Culture*
(credits: G. Lavoratti)

PRACTICES OF CULTURAL RE-APPROPRIATION: PROJECTS IN CO-AUTHORSHIP WITH THE FIRST INDIGENOUS PEOPLES OF SOUTH AFRICA

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Nelson Mandela University, South Africa

The ongoing collaboration between the First Indigenous Peoples, mostly residents of the Mandela metropolitan area, and staff and students of the School of Architecture of Nelson Mandela University, began in 2015, thanks to the understanding and at the same time the urgency to unlock the following aspects: there is very little knowledge about the First Indigenous Peoples' pre-colonial heritage located in the Eastern Cape; the available knowledge is the result of an external reading (colonial narrative); there is a disconnection between the First Peoples and their heritage sites as a result of the long history of segregation they have suffered, from the arrival of the European settler colonisers to this day.

The series of community engagement projects undertaken by the working group had the goal of promoting acts of reclaiming and reconnecting the First Peoples with their heritage sites, as well as the reformulation and reconstruction of the indigenous narrative, carried out by them. The visiting, documenting, and experiencing of the sites that the Chiefs indicated as crucial from an indigenous heritage perspective were combined with the inquiry concerning the narrative, the recording of the intangible heritage and the diffusion of the story as rewritten by the indigenous people.

The modus operandi was rooted in the indigenous protocols of consultation, and each step of the community projects, including the production of outputs, was deeply discussed, jointly designed, and approved by the indigenous leaders.

The first major project undertaken, between 2017 and 2020, was the mapping of the pre-colonial sites located along the coast, including the scientific site surveys of 3 major fish trap infrastructures, which at that time were unknown and undocumented. The survey was carried out with the involvement of the architecture students, guided by the chiefs and lecturers, in order to obtain practical knowledge of the heritage sites. Concurrently, the indigenous community was interviewed about their experience and memories of those sites. The project results have been published as an open-source book, and a short documentary was produced to promote easy accessibility and to further develop the debate within the community. The working group is engaged since 2021 with the survey of a village and of dwellings self-built by the Khoikhoi with local materials. These represent a unique case study in the country, never before documented, regarding an indigenous knowledge system which has been handed down from pre-colonial times to the present day. The survey of the dwellings, with the involvement of the students, is accompanied by the interviews with the inhabitants and the master builders concerning techniques, materials used and their living experience. Both projects are of great value for the groundbreaking research methodology applied, the recording and diffusion of the indigenous narrative, and the inestimable values and lessons derived from a sustainable approach to the environment.
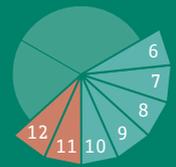
PEOPLE INVOLVED
Students, master builders, inhabitants and indigenous community

VERSUS SUSTAINABILITY PRINCIPLES
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
11. Supporting autonomy
12. Promoting local activities

Students of the School of Architecture - Nelson Mandela University during the site survey of the fish traps in Cape Recife, Nelson Mandela Bay, 2017

Gaob Margaret Coetzee (standing), community members and lecturer Lucy Vosloo during the interviews regarding indigenous building techniques, in front of a typical Khoikhoi traditional dwelling in Baviaanskloof, 2021

(credits: M. Minguzzi)

THE VILLAGE OF ESFAHAK: KNOWLEDGE TRANSMISSION ON VERNACULAR CONSTRUCTION TECHNIQUES IN THE IRANIAN DESERT

Edoardo Paolo Ferrari

Oxford Brookes University, Oxford, United Kingdom

WEB LINK

Esfahak Mud Research Centre:
www.esfahkmudcenter.org/en

VERSUS SUSTAINABILITY PRINCIPLES

1. Respecting nature and landscape
2. Taking benefit from natural and climatic resources
3. Reducing pollution
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
11. Supporting autonomy
12. Promoting local activities
13. Optimising construction efforts
15. Saving resources
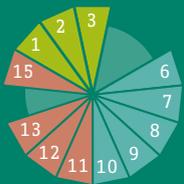
An old master teaching during a workshop in Esfahak

The moulding of a gypsum frame during a workshop with students for a special kind of arch

(credits: E. P. Ferrari)

Esfahak, a village in South Khorasan (Iran), is an exceptional example of contemporary inter-generational knowledge transmission with regard to vernacular architecture and construction techniques. The village was abandoned after the Tabas-e Golshan earthquake in 1978, when a new settlement was built next to the older one. The new village was built with completely different materials, techniques, house patterns and overall planning criteria. The earthen buildings of the original settlement were left and forgotten, together with their related construction techniques and knowledge. For more than 30 years all buildings were completely abandoned. The former settlement decayed progressively and was widely referred to by both the older and newer generations as gel-e kohneh 'old mud'. It was only less than ten years ago, and thanks to the interest and efforts of a group of young villagers, that the preservation and restoration of the old settlement began. Against the odds, they were able to collaborate with some architects in Iran to plan restoration activities and establish the *Esfahak Mud Research Centre*. Moreover, they involved a group of old master builders from the village and its surrounding areas to teach them how to work on traditional buildings. In an inter-generational process of learning and re-learning, both young and old villagers were able to recover the techniques and re-start a process of knowledge transmission. Old masters began once again to work side by side with a newer generation, forming a team that has provided the necessary skills for this enterprise. This momentum also brought about a different awareness towards the 'old', as more and more villagers gained a new perspective on their own architecture, partly due to their direct experience on the building sites and also by witnessing the results of this restoration work. The name 'old mud' was changed to baft-e qadimi 'historical fabric', a definition which imbues value and comes directly from the villagers themselves. The continuation and transformation of the village's architectural knowledge and tradition was possible thanks to this exchange process and to the creation of new opportunities for old and young people alike. The old village did not remain a ruin, neither was it transformed into an untouchable open-air museum, but has rather been reconnected to the lives of the people.

RED DE MAESTROS - NETWORK OF MASTER BUILDERS

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Universitat Politècnica de València, Valencia, Spain

The Spanish Network of Masters of Traditional Construction (Red Española de Maestros de la Construcción Tradicional) is a national directory of masters, trades and craftsmen who represent good practices both in the field of traditional construction and in the restoration of traditional architecture (www.redmaestros.com). It utilises a powerful search engine that permits locating these craftsmen both by trade and by the province in which they practice their professional activity. Its main purpose is to give visibility to these craftsmen so as to help support the survival of their crafts, some of which are in danger of disappearing. The idea behind this came from a project commissioned in 2012 by the Cultural Heritage Institute of Spain of the Ministry of Culture (IPCE) to the Universitat Politècnica de València entitled *Documentation and research for acquiring knowledge regarding the situation of traditional building systems, as well as the extraction, use and implementation of traditional materials in Spain* (https://www.culturaydeporte.gob.es/planes-nacionales/planes-nacionales/arquitectura-tradicional/actuaciones/materiales-tradicionales.html), which identified the main actors involved in the production and manufacture of traditional materials and in traditional construction in Spain. This first approach was essential for obtaining a clear picture of the situation regarding trades in Spain, especially at a moment of a serious economic crisis which was endangering their existence. Years later, the INTBAU Foundation, an international network promoting traditional building, architecture and urban planning, proposed to the Ministry the processing of this information with the purpose of creating this network of master builders. The network itself was created thanks to funding by the American philanthropist Richard H. Driehaus, through the INTBAU Foundation. The network has been well received and has had great success and has also received several awards such as the Hispania Nostra Award 2019 in the category of *Heritage preservation as a factor of economic and social development*, a Special Mention that same year from the Jury of the Europa Nostra Awards, and the National Crafts Award 2021 in the category *Promociona Award for Private Entities*. The network has also produced nine informative publications regarding the use, techniques and applications of materials such as lime, plaster, reeds and fibers, wood, glass, ceramics, stone, earth and metals, with a directory of the corresponding craftsmen.

HEAD OF THE PROJECT
Alejandro García Hermida

**COORDINATORS OF THE WORK TEAMS**
Alejandro García Hermida, Rebeca Gómez-Gordo, Camilla Mileto, Fernando Vegas

AUTHORS OF THE INITIAL WORK FOR THE IPCE
Camilla Mileto, Fernando Vegas, Valentina Cristini

VERSUS SUSTAINABILITY PRINCIPLES
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
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12. Promoting local activities
15. Saving resources
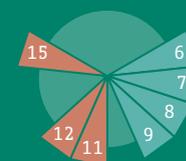
Detail of a craftsman working with fibers

(credits: Ubedíes Artesanía, taken from the book Maestros de cañas y fibras)

Detail of latticework carpentry

(credits: Paco Luis Martos Sánchez, taken from the book Maestros de la madera)

DOCUMENTATION AND DIGITAL SURVEY OF TANGIBLE HERITAGE
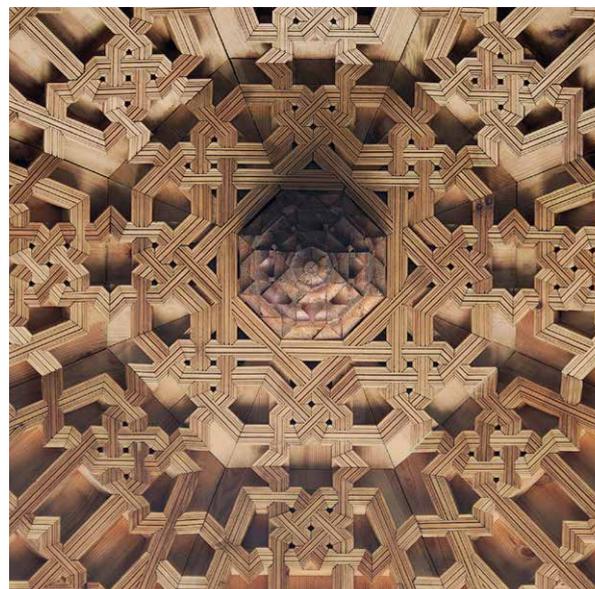
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The creation of reality-based 3D models of the tangible cultural heritage has become an increasingly common practice, which has been made only seemingly easy thanks to modern-day data acquisition systems. In particular, the use of structure from motion techniques based on shots taken either from the ground or by drone using commercial cameras, has made it possible even for non-experts in the field of digital surveying to carry out operations aimed at digitising (or virtualising) the existing heritage.

The production of so-called Digital Twins actually involves the development of generally complex workflows, the mastery of tools in the data acquisition (active sensors, such as laser scanners and passive sensors), management (point cloud management and digital photogrammetry software) and restitution phases (two-dimensional representation and 3D model editing software), as well as an in-depth knowledge of the objects to be documented in order to generate 2D and 3D products that properly bring out the morphometric and chromatic features of the assets under study. The survey is, therefore, a critical operation in which the technical and humanistic components must be properly balanced so as to obtain correct and, above all, useful results, in other words capable of satisfying the purpose for which the survey operations were carried out in the first place (Merlo et al., 2023).

opposite page
Digital Survey with 3D laser scanner at the *Viejo de la Mola* Mill, Formentera, Spain
(credits: CHM_Lab)

Reverse modelling

The creation of a polygonal model of an existing structure through a process of Reverse Engineering presupposes the prior consideration of at least two issues, which will condition the subsequent work pipeline: the morphometric and chromatic features of the asset in question and the specific intended use of its digital twin. In fact, the analysis of these two issues will make it possible to choose the most suitable parameters for digitising the asset, as well as to determine the most appropriate modelling techniques (or a combination thereof) for preserving, in perceptive and/or dimensional terms, the apparent shape and colour of the artefact.

Concurrent studies aimed at recognising the various different elements that compose them (semantic analysis), ranking them according to their function within the asset, the material with which they were made and the rules that subtend their form (taxonomic analysis), verifying the spatial relationships they establish with each other (topological analysis), and finally identifying their overall volumetric layout, will help guide the surveyor in the production of the 3D virtual copy and the resulting 2D drawings (Mandelli, Merlo, 2019).

2D and 3D rendering

It is not redundant to stress how, in the very midst of the digital age, 2D representations made through the usual operations of projective geometry (plans, elevations, sections, and site plan) are still the basic procedure which cultural operators, including architects, rely upon, both in their professional practice and in research. The tools and procedures of morphometric data acquisition and rendering have changed and no longer refer to the real object but rather to its copy, obtained through digitising operations, yet the intended result has remained unvaried, in other words survey drawings (in digital format) that are generally still printed to scale on paper.

The new feature, therefore, is a digital twin, which one can view, navigate and study at will, through all the systems and devices that Information Communication Technology (ICT) provides. 3D models can be enhanced with additional information, also drawn from potentially unlimited external databases, visualised in neutral, real or fictional environments, decomposed into their parts (if planned during the modelling phase), divided into sections and inquired upon, until they become part of a virtual environment in which objects and avatars (digital versions of a user) can interact with each other (metaverse). The digitisation of cultural heritage, carried out with the necessary scientific precision, can therefore meet multiple needs, among which those related to communication, dissemination and preservation through ICT and, in particular, through the WEB, which are increasingly gaining ground, also thanks to the support of EU policies.

To the well-established methods involving real-time navigation of digital models through screens or headsets, and their use and enjoyment by means of Immersive Reality (IR), Augmented Reality (AR), or Mixed Reality (MR), have been added other new modes, such as the Virtual Interactive Movie (VIM), which involves forms related to other areas of the creative industry, such as film, music, and video games, in order to benefit from Digital Cultural Heritage (DCH - D'Alessio, 2023).

Survey of the tangible heritage as part of the Versus+ project

As part of this project, several survey campaigns were carried out in the islands of Sant'Antioco and Formentera, in order to contribute to the knowledge of building and architectural features through a formal and dimensional - as well as typological, constructive and material - analysis of some buildings that

Sección AA
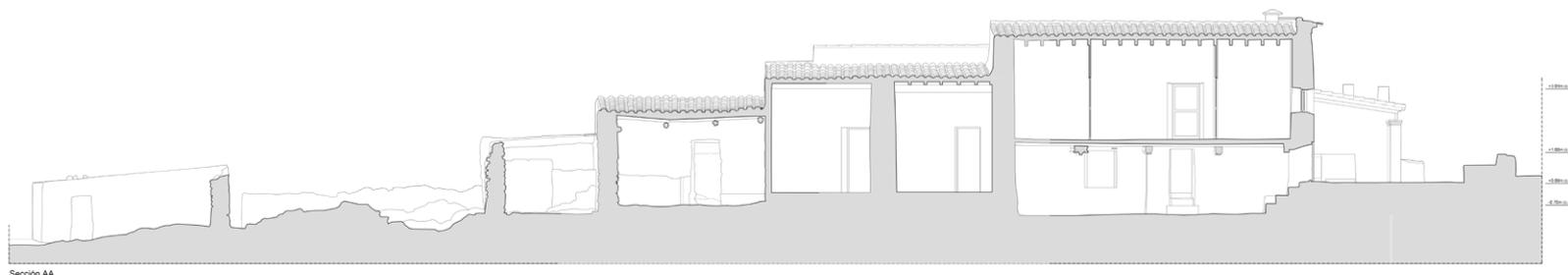
could provide information on the degree of resilience of the historical-cultural context in which they are located.

On the island of Sant'Antioco, and following a well-established morpho-typological tradition (Purini, 2021), buildings were selected which belonged to both a basic construction-type, in the town and rural areas (shacks), as well as to special construction-types: a productive structure (a tuna fishery, or tonnara), a defensive structure (tower), and a building used for cultural functions (*Ràixe*). Finally, a separate survey campaign was conducted of the urban section between via Marconi and via Solferino (from the Savoy Tower to piazza Pietro Belly), in order to document the layout of the Calasetta settlement – in other words, the conformation of itineraries and nodes (or poles) along which buildings have been arranged over time – as well as the processes and dynamics that occurred within the blocks themselves. The documentation work carried out in Formentera involved instead a traditional dwelling (*Sa Senieta*) located at the entrance of the town of Sant Francesc Xavier, as well as a windmill for grinding grain at the village of La Mola.

The rendering work focused particularly on Sa Senieta, which consists of the merging of two casaments, whose typical original plan layout, with its outbuildings and enclosures, is still recognisable. Its oldest core (the casa des majorals, which dates back to the first half of the 18th century) is distributed on a single storey and occupies a central position, whereas the more recent section (the casa des senyors, dating back to the 19th century) is located next to it to the south and on two storeys.

Notes on the survey procedures

A CAM2® FocusS 70 unit was used for the survey operations, as well as an DJI Mavic Mini 2 drone (in Calasetta) and a DJI Mavic Mini 3 Pro drone (in Formentera), as well as 20 Mpx reflex digital cameras with an 18-85 mm lens. The scans of individual buildings, given the small size of the structures, were made using a resolution of 1/5 and a quality of 3x, which allowed for a reasonable compromise between acquisition speed and data density. In the case of the urban section, however, the parameters adopted were 1/4 (resolution) and 3x (quality). In order to facilitate alignment operations using Autodesk Recap software, special attention was paid to ensuring a good overlap between adjacent scans.

Point clouds concerning the top parts of the buildings were derived through structure from motion

➔

Pointcloud of the *Viejo de la Mola* Mill in Formentera, Spain

(Autodesk Recap Prof, credits: CHM_Lab).

operations using Agisoft Metashape software from sets of images taken by drone; these point clouds, once aligned with the ones obtained by laser scanning, made it possible to produce an almost complete digital copy of the analysed structures.

The images taken by drones, as well as those taken from the ground, properly balanced using a colour checker placed when the photo sets were made, were also used to document the colour data. Also using Agisoft Metashape, orthomosaics were produced which, once scaled and oriented, were used both to obtain orthophotos and to texturise the 3D models. The latter were generated with Blender - a free and open source software that also allows UV mapping - from 2D data obtained from point clouds, using, as alternatives to each other, the Autodesk Autocad or the Leica Cyclone programmes.

The morphometric accuracy of the 2D data processed and vector rendered from point clouds was accompanied by 3D models, which, although less geometrically and dimensionally reliable, made it possible for artefacts to be visualised in real-time through graphics engines such as Unity (Unity Technologies).

Conclusions

Documenting the built heritage in an urban context with the purpose of studying the processes which, over time, have guided the transformations of the layout, as well as of the fabric and building types of a settlement, is an operation which, although considered to be essential, has become mostly relegated to an end in itself.

The principle of hic et nunc, which characterises the modus operandi of contemporary society, increasingly encourages even professionals in the sector to plan future interventions without due regard for the lessons of the past, to which the present is undoubtedly indebted.
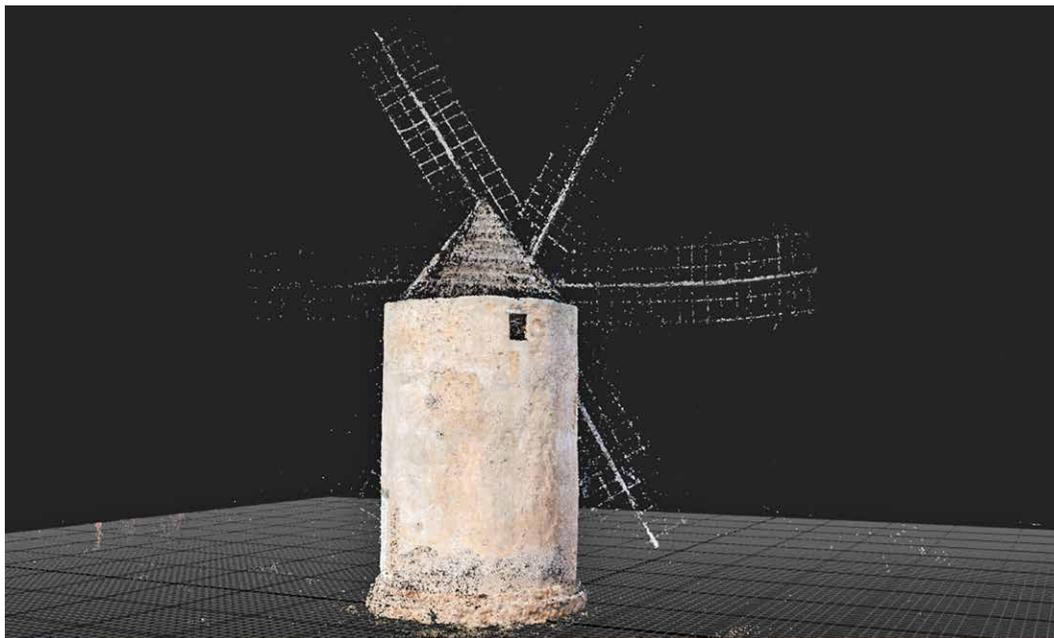
Heritage conservation and protection must, therefore, be based on the analysis of the historical processes that have generated and conditioned it to this day, as well as on the study of its actual state, so that it may be possible to intervene with the awareness necessary for both preserving it an handing it down to future generations.

The more information is available, the more possibilities there will be to suggest a range of valid solutions from which to select the one that better satisfies the preservation requirements, as well as those, equally legitimate, that regard the need for adaptation, and therefore change, in order to ensure the use and enjoyment of the assets, in the firm belief that a use compatible with the asset's "vocations of use" constitutes the best formula for its preservation (Germani, 2021).

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INTERNATIONAL WORKSHOPS ON TRADITIONAL ARCHITECTURE IN RINCÓN DE ADEMUZ, VALENCIA (SPAIN)

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Universitat Politècnica de València, Valencia, Spain

It consists of approximately twenty workshops for architecture students and young architects concerning the study, knowledge and drawing of vernacular architecture in the county of Rincón de Ademuz. These workshops have brought together for years hundreds of students from around twenty European countries, as well as from other countries, such as Morocco, Colombia, Argentina, Egypt, United States, Irak, China and Japan. The workshops usually have a duration of one or two weeks and take place in July or September. The students receive free food and accommodation at a rural hotel in exchange for their research work on the vernacular architecture of the area, which is particularly well preserved thanks to the centuries of isolation in which it has been until today. The workshops also represent a moment of interaction with the inhabitants, who offer their knowledge about the buildings and places, which is fundamental for the students to correctly and adequately represent the local vernacular architecture. These workshops have had various goals throughout the years: the skilful building details of vernacular architecture as the optimal result of the combination of needs and available materials, which derive from centuries of trial and error; the pre-industrial architecture related to construction processes of structures such as mills, oil mills, wine presses, wine cellars, distilleries, fountains, water troughs, bread ovens, wood piles to produce charcoal, forges, gypsum and lime kilns, etc.; the transformation of traditional dwellings with spaces connected to agriculture and raising cattle into contemporary housing, without these needs; the stratified landscape, including the natural forests, terraces planted with various types of trees, agricultural valleys and human settlements; traditional materials, their extraction, transformation and associated techniques, etc.

The results of this work have been published so far in two books that reflect the wealth and substance of the traditional architecture of Rincón de Ademuz, in addition to a restoration handbook specifically designed for this region, which offers advice for updating the standards in a process of renovation without, however, losing the charm and character of these traditional buildings.

USERS
Architecture students, young architects

PROMOTERS
Camilla Mileto and Fernando Vegas

VERSUS SUSTAINABILITY PRINCIPLES
4. Ensuring environmental comfort and well being
5. Reducing disaster risks
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
12. Promoting local activities
13. Optimising costruction efforts
14. Extending lifetime
15. Saving resources
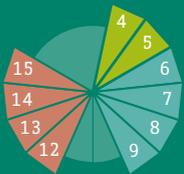
➔
Group of participants of the X international workshop on traditional architecture
(*credits: C. Mileto, F. Vegas*)
A diagram of the wine-making process based on the explanations and data collected on site during the workshops. Below, a plan of the excavated warehouses at Mas de Jacinto in Rincón de Ademuz
(*credits: Guillermo Guimaraens, taken from the book Vegas F., Mileto C., 2008, Homo faber. Arquitectura preindustrial del Rincón de Ademuz*)

DOCUMENTING AND VIRTUAL VISITING WORLD HERITAGE IN 3DPAST

Mariana Correia, Gilberto Carlos

CIAUD-UPT, Department of Architecture & Multimedia Gallaecia, Portucalense University, Porto, Portugal

The European project *3DPAST - Living & virtual visiting European World Heritage* enhanced the exceptional significance of vernacular architecture in World Heritage. The project highlighted the special character of these vernacular sites, and the intrinsic spatiality and architectural quality, daily experienced by their inhabitants. *3DPAST* brought the opportunity to discover the 'spirit of place' of vernacular dwellings, across Europe. The project aimed to attract new audiences to these properties, through AR experience in books, a Platform, and a in situ Mobile App (*3DPAST* is available to download at App store and Google Play). Non-traveller audiences had the opportunity to watch drone videos and to visit the sites through virtual and augmented reality, and 3D modelling. The project boosted interactive communication tools into new digital realities. It also enhanced, the creative potential associated with these sites' intangible culture and with their vernacular expression. This technological way of reaching new audiences was a distinctiveness factor, to document and disseminate vernacular heritage, little known by the general public, contributing to local identity and cultural diversity.

The work was developed throughout three Dimensions (Architectural Heritage Dimension; Historical Dimension; Intangible Heritage Dimension) and three Components of Work (Digital Component; Creative Component; Communication Component), expressed by several Activities, such as: Publications, a Booklet, an App, a Digital Platform, Technical Workshops, and Multimedia Workshops. All the activities were developed in vernacular World Heritage sites located across Europe: Upper Svaneti in Georgia; Pico in Azores, Portugal, Transylvania in Romania; Pienza in Italy; Old Rauma in Finland, Girokaster in Albania, Cuenca in Spain; and Chorá in Greece.

The project's team was composed of multidisciplinary experts in architecture, heritage, urbanism, multimedia, artists, among others, who contributed actively in the outcomes of the project. *3DPAST* outputs were shared among interested audiences across more than 100 countries, in the 5 continents. As a result, the European Commission evaluated the project's aims, focus, planning, methodology, and outputs, as Excellent. The project was funded under Creative Europe programme, between 2016 to 2020. *3DPAST* was coordinated by Escola Superior Gallaecia [now integrated at Portucalense University], with the partnership of Universitat Politècnica de València, the University of Florence, the University of Cagliari, and CRAterre-ENSAG.

VERSUS SUSTAINABILITY PRINCIPLES

6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
12. Promoting local activities
13. Optimising construction efforts
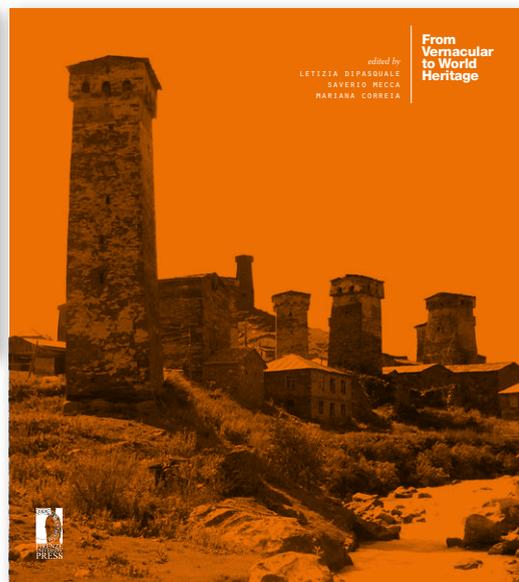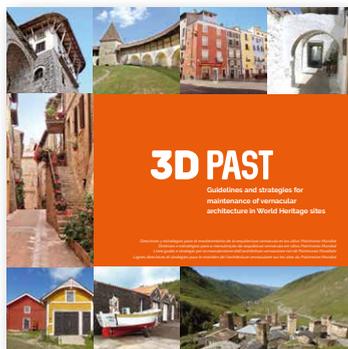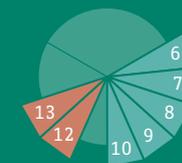
Some of the main results of the project: booklet, book and poster of one of the seminars

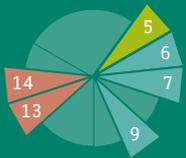## 3D SURVEY OF THE VERNACULAR ARCHITECTURE OF THE AYSÉN REGION

Carlos Castillo Levicoy, Constanza Pérez Lira, Amalia Nuevo-Delaunay

Corporación Memoria Austral (CMA), Chile

Centro de Investigación en Ecosistemas de la Patagonia (CIEP), Chile

VERSUS SUSTAINABILITY PRINCIPLES

5. Reducing disaster risks
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
9. Recognising intangible values
13. Optimising costruction efforts
14. Extending lifetime

The vernacular architecture of the Aysén region has been erected according to the geographical, climatic, social and insolated conditions that characterise it. The abundance of natural resources such as wood, earth, stones and fibers, among others, allowed the Euro-Chilean settlers who arrived to the area from the end of the 19th century to the middle of the 20th century to make use of building typologies that took into consideration the knowledge and techniques brought from other areas in the country and the world, thus allowing the developoment of unique architecture, strongly adapted to the territory. The cultural heritage of the carpenters from Chiloe was especially significant, whose knowledge, skills, and handling of woodworking tools would be reflected in the construction systems that are evident today. However, as Aysén's connections with the rest of the country improved, and access to mass-produced materials increased, local techniques and natural resources were relegated to the background, which ultimately resulted in the disappearance of many of these from the local architecture. On the other hand, to this must be added a rapid process of acculturation by the local population, which would directly affect the way of life and sense of cultural identity.

Due to the lack of knowledge and the devaluation of vernacular architecture over the past 70 years, currently, within the territory of Aysén, the existing information began to be consolidated through the use of 3D laser technology. The Trimble X7 3D laser scanner has made it possible to digitally register the characteristics under study. The data referring to: 360° panoramic images, the itinerary with 360° images, the filtered point cloud of each property - with a precision of 2mm between each point -, a 3D video of the route of the point cloud of the building and cuts of different sections for the reconstruction of its planimetry. This technology will also allow to carry out a comparative analysis of the records made at different time scales (years), of changes in the natural environment of the location, of damage to materials as a result of the passage of time and anthropic factors, of the identification of accompanying arboreal-shrub species and of spatial distribution, among others. Finally, the information obtained will allow the preservation of this unique and characteristic heritage of the Aysén region, as well as to raise awareness about it among the different local and foreign communities.

➔

General view of the main house of Fundo Cerro Galera, Commune of Coyhaique, Aysén Region, Chile.

Aerial view of the 3D point cloud of the set of properties of the Fundo Cerro Galera, Commune of Coyhaique, Aysén Region, Chile

(credits: authors)

MODELLING TRADITIONAL KNOWLEDGE ON EARTHEN DOMES OF SYRIA

Letizia Dipasquale, Saverio Mecca

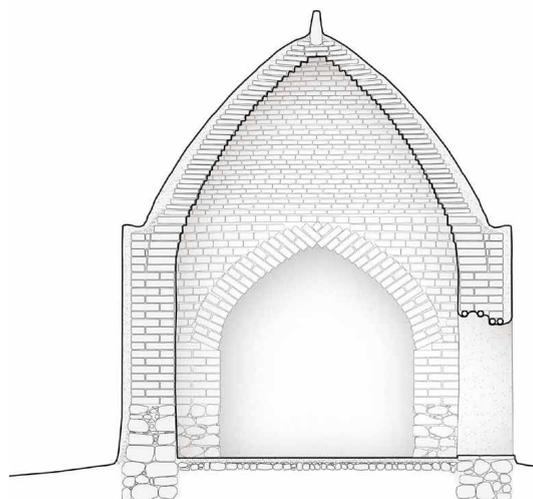Università degli Studi di Firenze, Florence, Italy

The earthen corbelled dome architecture of Syria represents a valuable example of vernacular architecture, as a result of a process of interaction and adaptation of communities to the environment with scarce natural resources over thousands of years. The project *Coupoles et habitats. Une tradition constructive entre Orient et Occident*, funded by EU Culture programme, was based on interdisciplinary research on the tangible and intangible heritage of the corbelled domes, focusing on the representation of architectural knowledge and a theoretical and experimental scientific analysis and interpretation. The interdisciplinary method of research started with the in-depth study of the corbelled villages during two on-site missions. The fieldwork produced a large set of data which became the basis for analysis and interpretation through the integration of different scientific approaches to urban, architectural, technical, archaeometrical, structural, geographical, ethnographic, and environmental dimensions. The different activities were organised so that each partner would interact with the others sharing data, information and knowledge, all converging at the goal of the project: the analysis and modelling of the vernacular architecture knowledge system. Thus, the urban context and the landscape, the building system and the architectural and functional analysis, were mainly based on data and information directly extracted in the field through traditional survey methods, which were integrated with the information produced by digital surveying methods. The mechanical analysis made use of both traditional survey and on-site testing methods integrating them with the information coming from building system and geomatic analysis. The mechanical tests conducted in a laboratory on materials, on a scale model and on a numerical model to simulate the structural behaviour, were supported by the detailed information regarding the shape and dimensions of the dome produced by geomatic analysis; the archaeometric analysis provided information on the mineralogical composition of the materials sampled during the field mission. The resource and environmental analysis, as well as the ethnographic analysis were developed through direct observation and a series interviews with people living in the villages and with building specialists, complemented with the scientific literature. The new information and knowledge were consolidated in order to gain a complete perspective of the subject for each discipline, but at the same time to obtain systemic information that enabled the modelling of a detailed representation of the architectural knowledge, and thus a codification of tacit local knowledge.

VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
4. Ensuring environmental comfort and well being
5. Reducing disaster risks
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
9. Recognising intangible values

Point cloud of a group of Sultan domes
(credits: V. Bonora, A. Nobile, G.Tucci)

Constructive section view of a Sultan dome
(credits: S. Onnis)

MANAGING VERNACULAR KNOWLEDGE FOR BUILDERS AND DESIGNERS

Letizia Dipasquale
Università degli Studi di Firenze, Florence, Italy
Telma Ribeiro, Rui Florentino, Mariana Correia
CIAUD-UPT, Department of Architecture & Multimedia Gallaecia, Portucalense University, Porto, Portugal

Values of authenticity, identity, and cultural significance that are often associated with historical cities and heritage centres are undoubtedly linked to a continuity in traditional knowledge. Building masters have been responsible not only for keeping the tradition alive but also for the conservation of the local architecture. Based on their experience, know-how, creativity, and craft skills, the masons are able to explore the local materials and adapt them to their construction needs (Karakul, 2015).

The transmission of vernacular knowledge is a practical, dynamic, and reactive process. It is usually an 'on site' apprenticeship, through observation, practice, and experiential learning. Due to the progressive loss of masters and apprentices, direct on-site transmission is not always guaranteed. In fact, especially in western countries we have witnessed a progressive loss of knowledge, know-how, techniques, and use of natural and low-impact materials for construction. To counteract this process, the role of public and private entities that try to keep traditional skills alive through the organisation of workshops, courses or training field schools is indeed relevant. During workshops and short courses architects and professionals can understand the materials and procedures, as well as the technical limits of building techniques and their implementations, all of which is useful information for a good design. For builders and craftsmen, it is essential that the experience lasts longer and can be repeated. In all these cases, oral transmission and observation are the main way of transmitting tacit knowledge.

Codifying and transmitting vernacular knowledge

Practices, actions and tools for the codification, management, organisation, and dissemination of tacit knowledge, thus making it explicit and easily shareable, remain to this day a field to be developed, strengthened and innovated, in order to ensure the maintenance of traditional know-how over time, even in the face of challenges such as climate change, as well as natural or man-made disasters.

The most consolidated tools for the codification of technological knowledge and the transmission of building knowledge are printed book: handbooks, guidelines, rehabilitation or restoration manuals (Giovannetti, 1998; Blasi, Gurrieri, 2007; Vegas, Mileto, 2007; Achenza, Sanna, 2008) intended to make the rules of good building explicit through textual descriptions, schemes, images and drawings, trying to codify a complex system of knowledge that ranges from the choice of materials, to the processes of execution, the control procedures and the most appropriate interventions to ensure the preservation of the values of traditional architecture. The elaboration of manuals or handbooks requires an
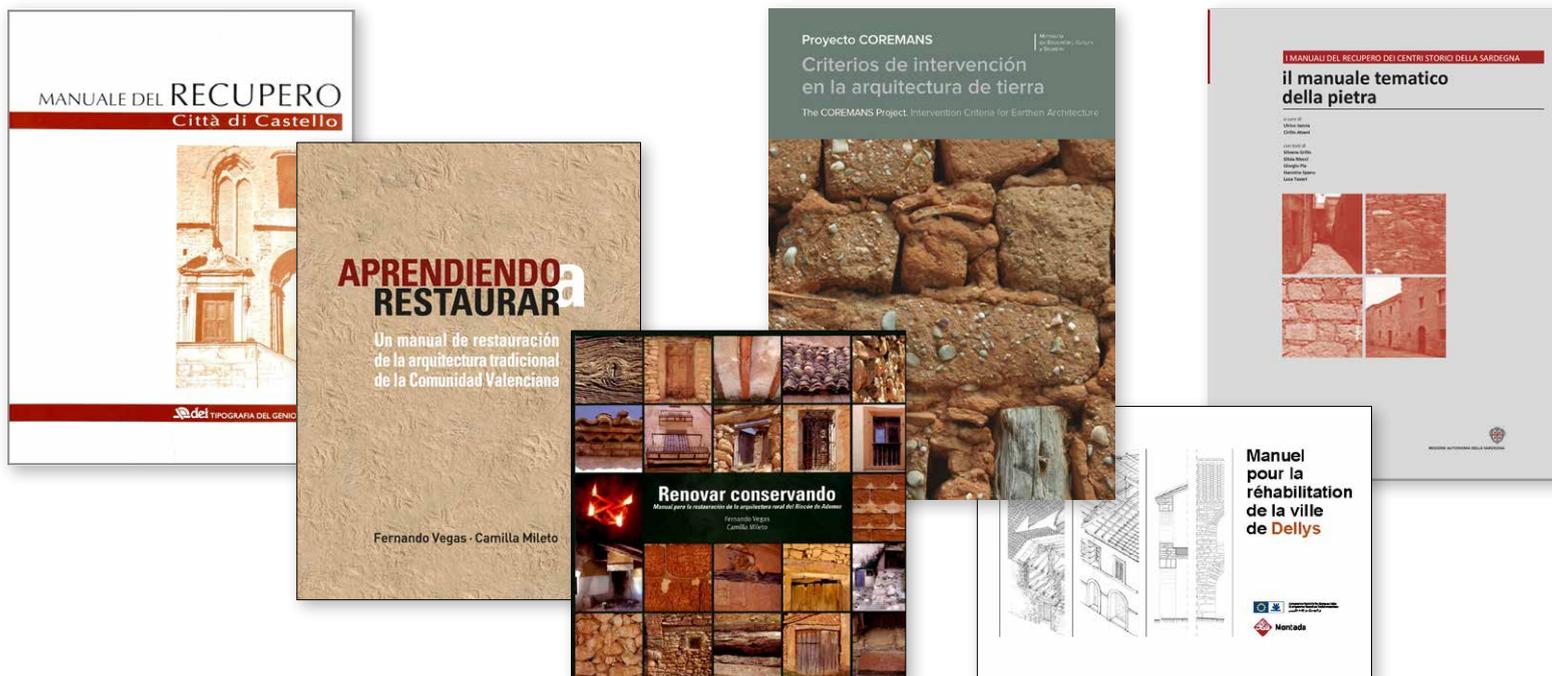
Covers of handbooks and rehabilitation / restoration manuals of traditional architecture
(Giovannetti, 1998; Vegas, Mileto, 2007; Vegas, Mileto, 2007; MECD, 2017; Achenza, Sanna, 2008; Atezeni et al., 2012)

interdisciplinary research work, aimed to represent through written codes and drawings, information regarding the material, structural, physical, procedural and dimensional characteristics of vernacular architecture. In order to understand the reasons and values of building systems and architecture, it is essential to also consider the environmental and social context, as well as the complex system of intangible values behind the evolution of a building culture.

Knowledge management and dissemination through digital tools

In the age of web and digital transmission, new possibilities have emerged for the management and dissemination of traditional knowledge, making it available to a much wider audience, while also extending the possibilities, means and forms of representation and communication.

The potential offered by the digital transition is extensive and increasing. Traditional manuals can be complemented with digital content by integrating web links, QR codes and augmented reality, thus enabling the visualisation of 3D models, and providing access to audio and video content, therefore expanding the possibilities of use, understanding and learning. Digitalisation processes of catalogues, inventories and databases make it possible to broaden the forms of access to heritage and knowledge, and to create new relationships between information, thus enabling its growth.

Advanced knowledge management tools could be applied to vernacular knowledge to ensure wider sharing and reuse of knowledge so as to support more effective conservation processes and design and planning actions. Ontology, semantic web portals (Cirinnà et al., 2007) and social media applications are examples of technologies applied to corporate knowledge management processes, which could also be extended to traditional building knowledge.

Online digital platforms are also a powerful means of dissemination, since they provide a space not only to collect and organise knowledge, but also to create networks of people (Dipasquale et al., 2022).

Furthermore, unlike dissemination through non-digital media such as printed books, digital platforms can be constantly updated and allow you to establish connections with other digital resources: social networks, specialised websites, video sharing websites, etc. Furthermore, platforms are a remarkable means to develop new didactic methodologies, curricula, entrepreneurship skills and courses for vocational training, to create jobs and revive enterprises.

Videos and social network events, promoted by architects, engineers, students, and academics, allow the dissemination of vernacular methods of construction within national and international perspectives (Cuéllar, 2014; Correia et al., 2020). Dissemination allows the interconnection between the construction and the research fields, thus contributing to the reduction of the gap between professionals and Academia, while also stimulating the use of traditional knowledge.

There are several examples of web portals and platforms that promote the spreading and managing of vernacular know-how that can be found within the European context, highlighting the importance of preserving the intangible and tangible aspects of traditional architecture.

Developed by CRAterre, *Cartoterra* is a database for earthen architecture. Working as a participative atlas, Cartoterra allows the sharing of content regarding earthen construction around the world, and it locates it on an interactive map. *Mapa da Terra*, again as part of earthen building knowledge, is a worldwide online collaborative database aiming at sharing knowledge and experience and allowing stakeholders to interact, contribute and be inspired by the content of the platform. The platform *Lehmbau im Weinviertel*, which was developed within the project *Think Spacial!* and concerns the knowledge and enhancement of earthen architecture in the Region of Weinviertel in Austria explores the interaction with Citizen Science through the involvement of locals in the mapping of heritage as well as the management of different kinds of materials.

Another valuable example of a platform devoted to traditional knowledge is *Red de Maestros* – the Spanish Traditional Building Masters Network, promoted by INTBAU (the International Network for Traditional Building, Architecture and Urbanism). It aims to bring together people and businesses, from each of the 17 Spanish regions, especially those that stand out in the preservation and the continuation of these crafts and that carry out a work of remarkable value in different traditional building crafts.

In the framework of this project, the UNIFI team has developed a collaborative Web Application (https://heritageforpeople.unifi.it/) able to map solutions and models from vernacular architecture, and to associate them with *VerSus* sustainable strategies. In addition to physical objects (cultural landscapes, urban, typological and technological solutions), the App also maps the people involved in the knowledge management of vernacular architecture. This tool aims to make knowledge accessible and to involve people in two ways: engaging with them so that they can contribute to the Web App contents (inclusive/collaborative approach), and linking references to people (professionals, craftspeople, communities of practice, universities, etc.).

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Some pages of the publication *Local Knowledge, Global Goals* contained in the platform promoted by UNESCO's *Local and Indigenous Knowledge Systems programme* (LINKS)

(https://en.unesco.org/links)

In the field of vernacular knowledge management (not only related to architecture but in general to land management and biodiversity), it is important to mention UNESCO's *Local and Indigenous Knowledge Systems programme* (LINKS). As part of this programme, the *The Local Communities and Indigenous Peoples Platform* (LCIPP) was recently developed, with the aim of strengthening the knowledge, technologies, practices, and efforts of local communities and indigenous peoples related to addressing and responding to climate change, to facilitate the exchange of experiences and the sharing of best practices and lessons learned on mitigation and adaptation in a holistic and integrated manner.

Within the European Union, ECTP is the main platform for research and innovation joining the fields of construction technology, built environment, and energy efficiency. Founded in 2004, it now includes 140 members from 26 countries, including large enterprises, universities, research organisations, and professional associations. Its position papers reveal different issues related to the *VerSus* project (Correia et al., 2014), especially in its *Heritage and regeneration* and *Materials and sustainability* committees, such as the promotion and recognition of vernacular architecture as an inspiration for design. For example, *Build-in-wood* is a consortium joining 6 cities, that covers the entire wood value chain from the factory to the final construction. The project manages the material, components, structural systems, and façade elements, both for new buildings and restorations, develops a Design Guide, and delivers digital case studies and prototypes.*Think Nature* is another example of a project in which ECTP took part. Funded by the Horizon Programme of the European Union, among several universities and other partners, it focuses on the improvement and application of Nature Based Solutions (NBS) for the building sector, in order to work with nature, instead of building in nature. The NBS combine traditional and ecological processes, designed to bring healthier features to cities and landscapes, addressing them to consider Sustainable Development Goals.

Not only related to architecture, the *Europeana* is also an international project funded by the European Union, aimed to strengthen the cultural heritage sector and its digital approach. It develops expertise, tools and policies, in order to embrace digital changes and encourage partnerships that foster innovation. The collected data is organised in five sections (image, text, sound, video, and 3D) and shared by more than 4,000 cultural institutions. The search displays by theme, type of media, permission to use it, providing country, language, aggregator partner, institution, colour, orientation, size, and format. It has an interesting functionality for teaching and storytelling, like other open-source initiatives with a similar purpose of spreading knowledge to a wider audience.

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VERNACULAR KNOWLEDGE MANAGEMENT AND DISSEMINATION • Managing constructive and architectural knowledge for builders and designers

HERITAGE FOR PEOPLE: A COLLABORATIVE APP

Letizia Dipasquale, Lucia Montoni, Università degli Studi di Firenze, Florence, Italy
Edoardo Paolo Ferrari, Oxford Brookes University, Oxford, United Kingdom

WEB LINK
www.heritageforpeople.unifi.it

USERS
Researchers, students, builders, artisans

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
12. Promoting local activities

➡ *Heritage for people* Web App for smartphone and desktop

Heritage for People is a collaborative App designed to provide everyone with models, examples and information derived from vernacular knowledge to encourage a better and more sustainable development in the field of architecture.

Vernacular architecture is characterised by a deep connection to the environmental, socio-economic, and cultural features of a place. In terms of sustainability, it offers extraordinary technological and typological solutions that respond well to different climatic conditions, and for this reason it provides us with more sustainable solutions even for our future habitats. The 15 sustainability principles identified by the EU project *VerSus: Lessons from Vernacular Heritage in Sustainable Architecture* have become leading attributes for indexing, assessing, and researching cases from the traditional to the contemporary architectural world.

The *Heritage for People* Web app includes contents on buildings, construction techniques, urban settlements and cultural landscapes, but also provides links to intangible cultural heritage and to the people and associations working on vernacular heritage.

The web App is a map-based platform with contents ranked by category (from cultural landscape to human scale), materials, type (traditional, contemporary or rehabilitation), and the 15 sustainability principles with their related strategies. The tool can be used both as a digital source of information and inspiration, and as a collaborative space where registered users can actively participate and insert new cases of valuable sustainable strategies.

The challenge is to stimulate knowledge through different channels that differ from the classic academic ones. Based on this need, the purpose of the App is not to create an encyclopaedia or a static digital catalogue, but rather a user-friendly and inclusive tool that enables everyone to access this knowledge. Thanks to digital media, the creation of 'real and digital communities' that can contribute to the development of an awareness towards these topics and their dissemination becomes possible. Moreover, Heritage for People is an open-ended app that allows for constant incorporations, updates and changes, thus offering the possibility to find new meanings of heritage and new strategies for sustainable design.
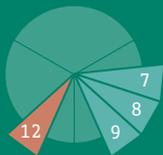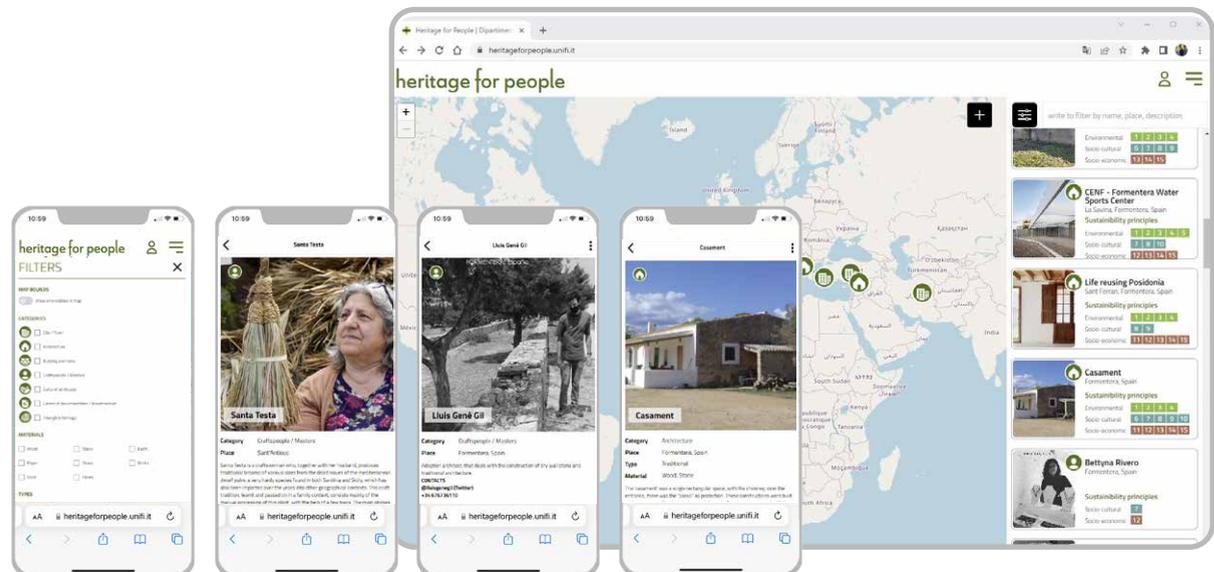
VERNACULAR KNOWLEDGE MANAGEMENT AND DISSEMINATION • Managing constructive and architectural knowledge for builders and designers

BEST PRATICE | 211

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LEARNING TO CONSERVE

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Fernando Vegas, Camilla Mileto

Universitat Politècnica de València, Valencia, Spain

This is a manual for the conservation and updating of the traditional architecture specific to the Comunidad Valenciana. However, it could be applied to many other places, in the Mediterranean and beyond, using similar architectural solutions and construction techniques. The introduction to the manual aims to answer the questions of what architectural structure should be restored, as well as why and how, before going on to describe the methodology required to learn about a given building, its values, and the intervention criteria to be applied. This is followed by a detailed description of the geography, construction materials and techniques that are typical of the Comunidad Valenciana, which together have resulted in the range of traditional buildings found throughout this region, both in groups and individually. Following this introduction, three major sections present the construction techniques, pathologies and interventions in detail. Almost one hundred construction techniques are explained in individual info sheets featuring two or more photographs, construction details and a descriptive text. In addition, each card shows the relationship between a given construction technique and others which tend to appear simultaneously in the same building, referring to the construction pathology cards in order to identify the most common issues, as well as to texts on interventions which may be of greater use for their conservation and/or repair. The construction pathologies cover approximately fifty types of issue frequently encountered in this type of construction solution, described mostly through photographs of real cases and descriptive texts which also refer back to other cards detailing construction techniques and related pathologies, as well as to texts on interventions. The section devoted to the interventions for conservation, repair and restoration opens up a wide range of possibilities following criteria which respect the essence and conserve historic materials. These interventions have not been devised as recipes to be imitated without question but rather as open possibilities to assess, adapt or improve any building individual readers may be focusing on. The manual is completed with the bibliography, a toponym index of the locations mentioned in the book, and a useful index of proper names to quickly locate pages where a type of building, construction technique, material or technical term has been included in this book.

USERS
General public

VERSUS SUSTAINABILITY PRINCIPLES
1. Respecting nature and landscape
5. Reducing disaster risks
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
13. Optimising construction efforts
14. Extending lifetime
15. Saving resources

Pages from the book
Learning to conserve

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VERNACULAR KNOWLEDGE MANAGEMENT AND DISSEMINATION • Managing constructive and architectural knowledge for builders and designers

CARTOTERRA

Sebastien Moriset
CRAterre, Grenoble, France

Cartoterra web pages

Cartoterra is a participatory atlas that aims to highlight the vitality of earthen architecture. It was launched in 2014 by several member institutions of the UNESCO Chair for earthen architecture including CRAterre, ICOMOS-ISCEAH, ProTerra and Città Della Tera cruda. The ambition of this database is to present what is being done on the planet to preserve earthen architecture and revitalise the contemporary use of this virtuous material. Anyone can upload images of old vernacular heritage buildings, contemporary structures incorporating earth or photos of events promoting earthen architecture. Four categories are proposed to characterise the images submitted: buildings, worksites, events and stakeholders. This database contains about a thousand images at the moment, which is not much compared to what is actually happening in the world. The interest of this site will grow with the gradual increase of the number of entries by professionals, researchers and students, but also by the general public interested in earthen construction.

This database is freely accessible and the public at large is invited to register and deposit new data. Cartoterra complements the blogs and newsletters disseminating information on earthen architecture. Anyone can create an account and contribute freely to this atlas. The languages of the site are French and English.

Other comparable atlases offer regional inventories of earthen architecture, such as the atlas of earthen architecture in France and England of the European CobBauge programme, which presents an inventory of contemporary earthen buildings that are less than 30 years old. The CobBauge inventory can be accessed from this link: www.cobbauge.eu/en/cobbauge-project/cob-mapping.

VERNACULAR KNOWLEDGE MANAGEMENT AND DISSEMINATION • Managing constructive and architectural knowledge for builders and designers

BEST PRATICE | 213

MAPADATERRA PLATFORM

Leticia Grappi, Kin Guerra
Architects and founders of mapadaterra.org, Brasil

Mapadaterra.org is an online platform that registers buildings made with natural materials. Its purpose is to contribute to the dissemination of construction technologies with a low environmental impact, as well as the use of intelligent solutions that follow sustainability procedures, respecting human health and protecting the environment.

The records, collaboratively produced, are created by the professionals who work on the projects: the architect, the builder, the owner of the building or a researcher. Information can be shared regarding the context in which the building is situated, the construction process, the professionals involved and the techniques applied, among other data.

Mapadaterra makes it possible to search by areas of interest, since the platform is organised into different categories. For example, a user can look for schools made with adobe vaults or for cultural centers built with bamboo. Historic buildings, with their importance for human memory, can be added, as well as current works showcasing the contemporary production of specialised professionals.

Mapadaterra aims to educate and inform its audience, and presents numerous possibilities for the use of natural materials in the construction of healthier and more welcoming spaces.

In Brazil and in the Global South in general, constructions built using natural resources are stigmatised, since they are usually associated with poverty, poor construction quality, less durability and transcience. Even today, there are people in certain areas of Brazil who live in extreme poverty and social vulnerability who inhabit buildings made of raw earth.

We acknowledge that the problem lies in the social differences and not in the material or techniques used in the construction. Therefore, it is essential to face up to the social inequalities and the severe environmental crisis we suffer. The discussion must then be broadened through practical and innovative initiatives.

We hope that the site map can contribute to dispel the bias regarding architecture and construction techniques which use natural materials. It can, thereby, serve as an inspiration and offer solutions for those who seek to build in a more sustainable way, respecting traditional building methods. With this site map, our aim is to pay tribute to the professionals who work in this way and carry out research in this area.

The Mapadaterra site, established independently, has important backing, from entities such as the Rede TerraBrasil, a network which gathers professionals specialised in construction with raw earth in Brazil. The site map exists thanks to the support of the people: everyone can register and be a part of this network!
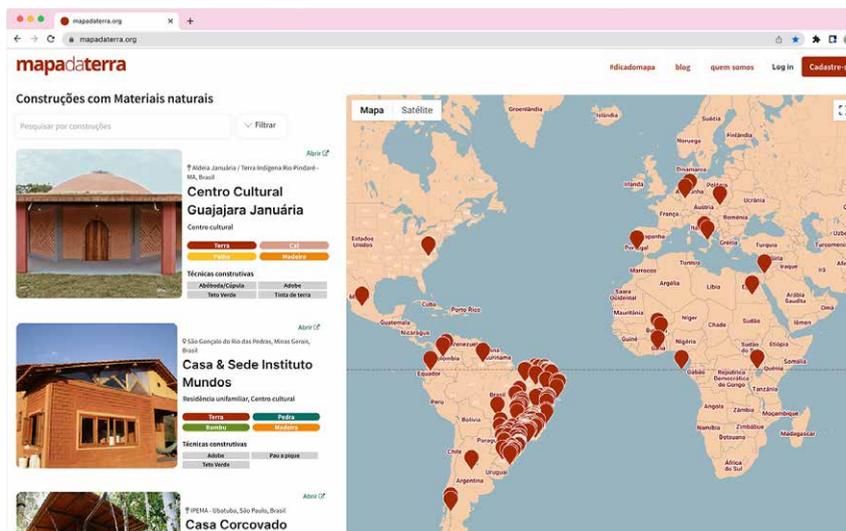
SHARING KNOWLEDGE WITH A WIDE PUBLIC

Sebastien Moriset
CRAterre, Grenoble, France

Vernacular architecture is the most accessible form of heritage for the public. It is less spectacular than monumental buildings or some ancient archaeological sites, but it has the advantage of speaking to everyone and being everywhere. We must take advantage of this anthropological dimension that makes this architecture familiar and accessible to disseminate the key lessons they convey. The *VerSus+* project partners are already carrying out a wide range of activities to popularise and disseminate the scientific knowledge they have accumulated over the years. Promotional activities contribute to the understanding and empowerment of the public, who in turn has an essential role to play in conservation. Conservation is everybody's business and we need to make this fact known through wide dissemination, using all the communication means available today. Below are some of the actions commonly used to sensitise the public, children and adults alike.

Festival

Festivals or summer schools such as *Full Immersion nella terra* in Sardinia, Italy, *Grains d'Isère* in Villefontaine, France, *Bellastock* in Paris, France, or the *Base-Habitat summer schools* in Austria are aimed at the public at large and are great places for interdisciplinary and intergenerational meetings. Their ambition is to share scientific knowledge and practical know-how with the general public. For the public, the advantage of these events is to be able to understand by experiencing, alongside real professionals. The experience is much more enriching and instructive than a computer screen search for information. It allows for exchanges and encounters and strengthens one's confidence in ecological building materials.

Ecomuseum

Ecomuseums, which are vernacular architecture that are museified and animated by various activities for all type of public, are very popular tourist attractions. They allow visitors to understand the anthropological dimension of this architecture. These interdisciplinary platforms are also more democratic forms of museums where inhabitants are strongly involved in the creation and the animation of the place. One discovers in such places the construction techniques, the lifestyles and customs of the people, and the traditions of the time. These visits often appeal to all the senses, with food -tastings or hands- on contact with building materials. Although the 'museificatio' of these buildings freezes them in

⬆
Day of information on conservation techniques for earthen structures open to the public, who can test and implement small conservation works, Four, France

(credits: author)

a specific period, blocking their contemporary evolution, it allows the preservation of knowledge and showcases authentic examples that serve as scientific references. The craftsmen working on the maintenance of these historic structures are often actors of contemporary eco-construction projects within the same geographical area.

Pathways and signage

We are familiar with tourist information panels placed on major historical monuments. It is also possible to create heritage routes dedicated to vernacular heritage and to all the intangible heritage linked to it (crafts, beliefs, traditional use of natural resources to eat, build or produce energy, for example). Heritage professionals can work with tourism and land-use planning professionals to create heritage trails equipped with information panels explaining how the territory has been transformed over generations into the landscape that is visible today.

Videos

Video is an essential medium for enhancing the intangible dimensions of vernacular architecture. It provides a means of receiving and transmitting interviews with craftsmen, material producers, construction site sequences and testimonies on the lifestyles of the inhabitants. Documentary series presenting the ways of life of humans around the globe are numerous and abundant in information. Vernacular architecture from all continents is well represented, and their occupants usually play a central role in the narrative. But these films often focus more on the lifestyles of the inhabitants than on the ecological dimension that *VerSus* seeks to promote. It is still difficult to find videos that address the environmental, socio-cultural and economic dimensions of construction over the entire life cycle. There is still a lot to be done to ensure that all the video material that researchers have at their disposal, such as interviews with craftsmen, are posted online and accessible to all audiences.

Social media

Social media have become the main vector for popular dissemination of knowledge. They are still little used for sharing knowledge on vernacular heritage, but they serve to promote events such as site visits, specialised training courses, festivals or exhibitions. Social media are also tools for mobilising citizens to defend the preservation of heritage categories endangered by major development projects. The Web is full of groups dedicated to specific heritage categories such as villages or historic city centres.

Exhibitions

Walking or cycling through the landscape is an excellent way of appreciating vernacular architecture, but it does not provide a full understanding of its complexity. The subject is so vast that it can give rise to different kinds of exhibitions: photographs or paintings exhibitions showing the aesthetic beauty of vernacular architecture, historical and anthropological exhibitions, but also technical exhibitions on the materials used and their properties. The exhibitions on earth as a building resource that have been touring the world for the past 10 years have proved very popular and have shown the public's interest in the architecture challenges. In its version presented at the Cité des Sciences in Paris, the exhibition titled *Ma terre première, pour construire demain* received 250,000 visitors.

Competitions and awards

We are familiar with international awards for great architects, but there are also more discreet competitions that reward lovers of vernacular heritage for their good deeds. In France, *Maisons Paysannes de France* for example organises competitions to reward remarkable restoration projects that respect local culture and know-how and use environmentally friendly materials. They also organise heritage

➜
Information signs dedicated to vernacular heritage in Saint Chef village (France)
(credits: author)

drawing competitions for children. The *Direction du patrimoine culturel* in Burkina Faso has also organised several competitions for the most beautiful conservation in order to encourage Kassena women to maintain their decorated earthen compounds. Such initiatives can create popular excitement for good practice.

In addition, labels such as the *Plus beaux villages de France* label can encourage municipalities to manage the evolution of their territories in the best possible way.

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FULL IMMERSION NELLA TERRA

Maddalena Achenza

Università degli Studi di Cagliari, Cagliari, Italy

Full Immersion nella Terra is an educational activity which since 2016 has been organised every year in Sardinia (Italy) by DICAAR - Dipartimento di Ingegneria Civile, Ambientale e Architettura - Università degli Studi di Cagliari, in the frame of the UNITWIN UNESCO Chair *Earthen Architecture, Building Cultures and Sustainable Development*. Activities are carried out in collaboration with local associations, and include hands-on workshops, thematic seminars on earth building and guided tours to local earthen architecture.

The hands-on workshops are coordinated by professionals trained at CRAterre, an International recognised centre for the formation of professionals specialised in the conservation and construction of earth buildings.

Participants are students and teachers of architecture and engineering, professionals, artisans, as well as common citizens who wish to know more about this building material. Attendees learn to identify and employ earth as a material for construction, as well as the different earth building techniques which use earth bricks, rammed earth, wattle and daub, and the use of mixes of plant fibers and earth. The contemporary presence of different actors, with different skills and expectations, make this experience very stimulating and enriching.

Activities include seminars focused on specific topics related to vernacular architecture, building techniques, building innovative practices, building elements, artisanal and industrial production, with particular attention to circular and sustainable processes.

The programme is completed with tours to earthen houses, made accesible by their owners, that offer perfect examples of the quality of these buildings and their adaptiveness to contemporary needs.

WEB LINK
www.linktr.ee/
fullimmersionnellaterra

USERS
Students and teachers of architecture and engineering, professionals, artisans and common citizens

VERSUS SUSTAINABILITY PRINCIPLES
3. Reducing pollution
4. Ensuring environmental comfort and well being
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
12. Promoting local activities
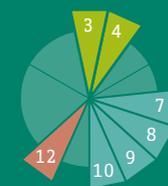
Some photos of the workshops coordinated by CRAterre during *Full Immersion nella Terra*

(credits: M. Achenza)

GRAINS D'ISÈRE FESTIVAL

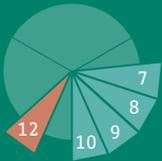Bakonirina Rakotomamonjy
CRAterre, Grenoble, France

USERS
General public, students, elected officials, trainers and professionals

PROMOTERS
CRAterre

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
12. Promoting local activities

The *Grains d'Isère Festival* has been held since 2002 at the *Grands Ateliers de l'Isle d'Abeau*, in the region of Auvergne-Rhône-Alpes in France, where thousands of rammed earth buildings can be found.

The festival aims to promote, among the general public, elected officials, trainers and professionals, the most ecological of natural materials: earth. This is the main construction material for the inhabitants of the region but also for more than one third of the inhabitants of the planet.

Around the triptych of architecture, arts and sciences, and starting from a huge pile of earth, the extraordinary qualities of the material are put on stage. The festival invites participants and visitors to discover its potential. This approach based on the understanding and manipulation of a freely available local material is developed in the form of scientific animations, experiments, prototypes, conferences, exhibitions and shows.

The festival also provides an opportunity to raise awareness of the advantages and challenges of eco-materials. Each year, the festival deals with a specific issue concerning economic and eco-responsible housing and the future of heritage.

The festival programme is developed within the framework of the post-master's course DSA-Earthen Architecture of the Grenoble School of Architecture in France. The students carry out projects in teams which allow them to deepen the knowledge acquired during their first semester of training. In most cases, these projects respond to requests from real needs expressed both in France and internationally. For the students and participants, it represents an important pedagogical moment based on action, experimentation and exchange.

The *Grains d'Isère Festival* is a true and proper educational factory, which attracts hundreds of participants from all over the world. It allows, through science, multiple experiments and pilot projects, to take stock of the considerable progress concerning the renewal of the construction logic. It instils a spirit of discovery and openness in responding to the major challenges and issues of sustainable development and helps mankind come to terms with its impact on the environment.

Grains d'Isère festival
(credits: Audrey Carbonnelle, Patrice Doat)

HOMO FABER EXHIBITION

Francesco Trovò
Università IUAV di Venezia, Venice, Italy

The island of San Giorgio Maggiore in Venice hosted the second edition of *Homo Faber*, an event devoted to the international exhibition of objects produced by numerous craftsmen specialised in decorative manufactures and applied arts. The visit offers an immersion in the applied knowledge of high-quality craftsmanship in various fields, documented through a variety of materials transformed into products. In addition to the exhibition hosted in the cloisters of the convent of San Giorgio, it is also possible to visit craftsmen scattered throughout the city and the islands, all of which are open to visits for the duration of the event, thus facilitating the unfolding of an immersive itinerary, which can also be tailor-made to the interests of each visitor, who in this way can witness the daily life in a workshop and observe craftsmen as they demonstrate their skills.

The event offers an opportunity to reflect more generally on the role of craftsmanship in the context of the safeguarding of the built heritage, in particular of the building of historic centres which are more common and less monumental, thus including examples of vernacular buildings, or building components. It is quite evident, in fact, that transformation interventions which regard unlisted historic buildings, which often make up the fabric of the historic centres of large cities, such as Venice, or are rural expressions of the built environment spread throughout the territory, are frequently less concerned with preservation. This trend depends, of course, on the existing legislation, but is also favoured by the fact that the crafts involved are increasingly less related to the place in which they operate, and often belong to other fields, such as that of new constructions, that lack the necessary references to the material culture underlying vernacular architecture, which in turn is an expression of the material products of craftsmanship practices.

In an era characterised by the prevalence of mass production, as well as by the digitisation and dematerialisation of processes, the success of the two editions of the exhibition, with more to follow, confirm the importance of this event as a worldwide reference, and demonstrates the great interest of the public in craftsmanship, its expressions and outstanding products. The spirit which guides the promoters of the initiative, a non-profit organisation from Geneva which supports contemporary craftsmen throughout the world, is also that of sending a signal about Venice, helping it to become once again an active place, declaring that craftsmanship, in all of its forms, from historicist accounts to more contemporary interpretations, represents the appropriate formula for saving the city from its decline.
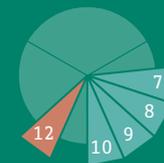
Three works created by the paper sculptor Cristian Marianciuc for Magnae Chartae at the Homo Faber Event 2022
(credits: Cristian Marianciuc)

Homo Faber Event 2022, Ph. Francesca Occhi
(credits: Fondazione Giorgio Cini)

REGIO EARTH

Alina Negru, West University of Timisoara, Romania
Alessandro Serra, TERRApia

Banat is a historical region divided between Romania, Serbia and Hungary. This cross-border multicultural area benefits from all the natural resources for building, so the vernacular architecture presents a great variety of earthen building cultures: from structural earthen techniques in the plains to a combined system of wood and earth, with stone foundation in the higher lands. In addition to the classical rammed earth and adobe, there are many interesting hybrid techniques which use earth, fibers and lime, such as wattle and daub, half timber with earth and light earth rolls.

Inspired by the diversity of these techniques, three associations (the Italo-Romanian collective Atelier Terrapia, the Serbian association KFZ Fine Art&Craft Club and the Hungarian National Association Körépítuk) founded in 2017 the *Regio Earth Festival*. *Regio Earth* is an itinerarant festival about earthen architecture, design and art. The festival moves every year in one of the founding countries (Romania, Hungary and Serbia) and connects earth lovers and specialists from Central and South-Eastern Europe.

The focus of the cross-border organising team and of our international partners is the protection of the earthen common heritage of our region, while finding new ways to integrate it in our present socio-cultural dynamics. We consider that the dissemination of local constructive techniques with natural materials and experimenting with innovative ones is the main step towards its protection. Also, connecting the local with the international professional communities is an experience which benefits both parts, who in this way discover together the sustainability of building with earth.
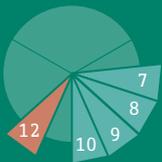

WEB LINK
www.regioearth.com

USERS
General public

PROMOTERS
Atelier Terrapia, KFZ Fine Art&Craft Club, Hungarian National Association Körépítuk

VERSUS SUSTAINABILITY PRINCIPLES
7. Transmitting and sharing building cultures
8. Encouraging creativity
9. Recognising intangible values
10. Encouraging social cohesion
12. Promoting local activities

→ The second edition of the Regio Earth in the village of Buzad in Romania, 2018
(credits: Andrea Dinca)

→ Workshop during the Regio Earth in the village of Buzad in Romania, 2018
(credits: Andrea Dinca)

Regio Earth in Serbia, 2019
(credits: Cosmin Neagu)

EL ADOBE EDUCATIONAL VIDEO

Amanda Rivera Vidal, Cristian Muñoz Catalán

Rivera+Muñoz Sociedad de ideas mutuas, Chile

EL ADOBE is an educational video created by the architect Amada Rivera Vidal, specialised in earthen construction and vernacular heritage, together with the audiovisual producer and teacher Cristian Muñoz Catalán, through their association R+M, which was created after the 2010 earthquake to disseminate knowledge concerning the country's traditional adobe and earth constructions, their possibilities of repair and their importance for the preservation of heritage and national cultural identity.

EL ADOBE educational video, transmits knowledge about earthen construction in Chile, and focuses on adobe structures. It is the result of an investigation carried out in the central zone of Chile, and thus represents its building culture. Earthen blocks are the most used technique in historic earthen constructions in Chile, it is part of its heritage. Despite this, adobe is a very misunderstood technique which has almost been forgotten. This building technique is hardly taught anymore in either construction itself or in architecture schools and this results in a significant lack of knowledge among professionals. The transfer of knowledge from generation to generation has been lost, and along with that the building culture.

This video aims to be a contribution to rescue that culture, contribute to the strengthening of heritage and promote the reintegration of earthen construction in the training of construction professionals and technicians.

Through clear and direct language, it seeks to bring technical parameters closer to a wide audience, in order to support decision-making in heritage interventions, as well as in pedagogical work on heritage and earth constructions.

The educational video relates, in 27 and a half minutes, the cultural importance and precise technical aspects of the diversity of adobe constructions in the country, through animations and images recorded throughout the country, all of which accompanied by a voice-over story.

For its realisation, it received technical advice from the engineer Gerardo Fercovic and the architect Marcelo Cortés. In addition to the support of the architects Katerina Ferrada and Patricia Marchante in the production stage. And with the collaboration of the masons Germán Villavicencio, Leonardo Pedreros, Pablo López, Pedro Sáez, Patricio Sáez and Wladimir Cornejo. This project has been financed by the Ministry of Culture, Arts and Heritage of Chile through the National Fund for Cultural Development and the Arts, FONDART Regional 2011.
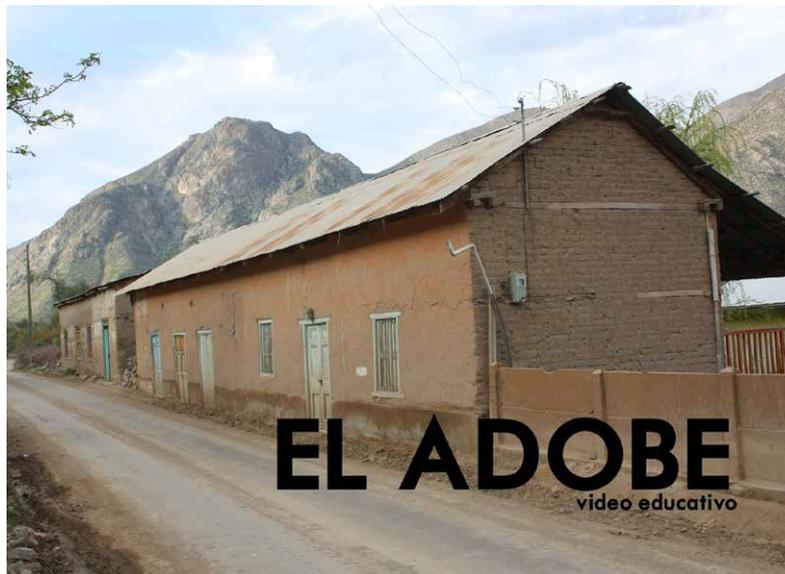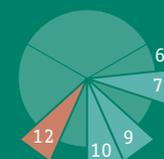
WEB LINKS
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www.riveramunoz.cl/web/

USERS
Technical professionals, craftspeople and wide public

VERSUS SUSTAINABILITY PRINCIPLES
6. Preserving the cultural landscape
7. Transmitting and sharing building cultures
9. Recognising intangible values
10. Encouraging social cohesion
12. Promoting local activities

Recording of the educational video in Aculeo, Chile

Adobe construction in Tulahuen, Coquimbo Region, as an example of the adobe building culture

(credits: Authors)

FORMENTERA: CULTURAL HERITAGE AND SUSTAINABILITY

Fernando Vegas, Camilla Mileto, Lidia García-Soriano, Valentina Cristini
Universitat Politècnica de València, Valencia, Spain

Environmental context

With an extension of 83.2 km^2 the island of Formentera is the fourth largest and southernmost island of the Balearic archipelago. Its geographical features and climate, along with its cultural, natural, landscape and architectural heritage, make it an extremely rich natural landscape whose appeal to tourists is undeniable.

Despite its seemingly flat relief, this small island is full of contrasts, where elements such as dunes, gullies and cliffs break up its skyline. Stretching out from east to west, there are two promontories (Cap de Barbaria and La Mola) at each end of the island. The two flat massifs are connected by a narrow strip of land with a low relief. Most of the island is a few metres above sea level, barely 50 to be exact, except for a small part of Cap de Barbaria and most of La Mola.

Several types of water resources can be found in Formentera. Most notably, the salt pans are one of the elements which have been worked on the island since antiquity. These are flat portions of land (or *eras* in Spanish) at sea level, from which salt is obtained by evaporating seawater. In their immediate surroundings we find the pools, hypersaline water deposits formed by depressions in the land.

Since the island's water courses, which are seasonal, take the form of steep rushing streams, found mostly in Cap de Barbaria and La Mola, the central part of the island has no source of natural irrigation.

Current regulations on the island establish a series of areas which have been granted different levels of protection depending on their landscape interest. As well as the Ses Salines Natural Park (declared a protected area by the Balearic Parliament in 2001), which includes the surroundings of the salt pans of both Ibiza and Formentera, along with the strait of Es Freus, a large part of the island is covered by extensive areas of particular natural interest linked to the coast and the inland areas of La Mola and Cap de Barbaria. The formation of the materials which make up the island of Formentera is relatively recent (from the eras of the upper Miocene, Pleistocene and Holocene), so that the origin of the elevations of La Mola and Cap de Barbaria is not the result of the orogenic movements of the earth's crust. Furthermore, although they are not apparent on the surface, there are signs of small folds of Miocene matter in Cap de Barbaria. Calcareous rock predominates on the island, both on the elevated rocky platforms and on the lower areas with sedimentary material. The karst modelling of these materials is the result of the water erosion of rock, which in turn forms its diverse coastline.

opposite page
Landscape of the Formentera island at Cap de la Mola facing the Mediterranean Sea, where cultivated fields are mixed with wild shrub vegetation and aromatic plants
(credits: F. Vegas, C. Mileto)

⬆
Fishing has traditionally been one of the fundamental activities for the subsistence of the inhabitants of the island

Agriculture has historically supplemented the diet of the island's inhabitants. Man picking figs from a fig tree

(credits: F. Vegas, C. Mileto)

The island of Formentera has a relatively sunny climate, with an annual mean of close to 2700 hours of sunlight, lowest in December and highest in July. There are overcast skies approximately 46 days per year, compared to 94 days of clear skies, so that all the remaining days are partly cloudy.

The mean temperatures on the island range from 12ºC in January-February to 26ºC in August, with an annual mean of 18ºC. However, throughout the day there are major oscillations in temperature, reaching up to 8ºC in both summer and winter. As the island is so small variations in temperature between the different areas are barely noticeable.

Given the high variability of this factor throughout the year, monthly rainfall distribution can vary significantly. However, the rainy season is mostly concentrated in the autumn months, with some rainfall in summer, especially in the month of July. Given the temperatures on the island, precipitations are almost exclusively in the form of rain.

In addition, prevailing winds on the island of Formentera are easterly in the summer and westerly in the winter and are therefore far more noticeable in coastal areas than inland.

The materials available on the island of Formentera are mostly stone, timber, earth, lime and other plant elements such as fibres and seaweed. Stone, found all over the island, is the main construction material. Uncarved stone is commonly used, either in dry stone constructions or with lime or lime earthen mortars. The Marés stone quarries in Formentera provide this calcareous stone which is easy to work but is also easily eroded by the elements. As in other regions, timber is also an essential element for traditional architecture in Formentera. Of all the types of wood available on the island, pine and juniper are used for construction. This basic material in local construction is used both for mortar in the different stone structures and for interior and exterior rendering and reinforcement. Ceramic materials were rare in the past. In the early 19th century the introduction of ceramic roof and floor tiles began to change the physiognomy of the island's constructions. Different forms of earth are commonly used in the traditional construction of roofs. Earth is also used in the production of mortar for masonry walls.

Although originally only earth was used, lime was later added to the mix. Furthermore, Posidonia seagrass, a marine plant endemic to the Mediterranean, has traditionally been used as insulation in the construction of roofs in Formentera. The leaves come off naturally and accumulate on the coast, where they dry in the sun.

Sociocultural and economic context

After the repopulation of Formentera, which began in the late 17th century, a subsistence economy, based on the primary sector of agriculture, livestock farming and fishing, resulted in a scattered occupation of the land, with no major population nuclei, even around churches. Drinking water was a precious resource obtained only from underground wells and the collection of rainwater. Salt pans had always been worked, but in the late 19th century their production was organised efficiently. Fishing from boats was another essential activity in this subsistence economy, and fish was only commercialised when there was an excess. In the mid-20th century, tourism took its first few steps.

The improvements in infrastructure of the early Sixties reached their apogee in 1966, when Ibiza airport was opened up to international and domestic transit. The regular sea connections between both Pityusic islands provided a definitive boost to tourism, resulting in a three-fold increase in the number of tourists visiting Formentera between 1965 and 1970, while available hotel accommodation also tripled. The advent of mass tourism encouraged the execution of improvements which had long been sought by industry, but had been ignored until then, including the construction in 1968 of an electric power plant. Thus, the arrival of tourists also, in principle, helped the industrial sector.

This boost to the construction of new infrastructures and the establishment of new installations brought about a demand for labour, so that, along with tourists, workers from different parts of Spain came searching for employment.

The subsistence model was replaced by a capitalist economy, leading to the progressive abandonment of the traditional way of life which revolved around agriculture and livestock farming. Thus, a process of abandonment began, affecting the crop fields which had been a major part of the island's landscape and character. Production stopped in the salt pans in 1985 and the area was finally declared as a natural reserve in 1995, permanently protecting this area of great value from large-scale construction.

Tangible heritage

Landscape

Despite its small size, the island of Formentera offers a multifunctional rural landscape of great wealth, bathed by the sea. This Mediterranean landscape has a predominantly horizontal terrain, without large outcrops except for the steep cliffs.

An initial examination and visual analysis of the territory makes it possible to identify different landscape units (LU) based on their physical appearance and cultural representation, that is to say, geographical

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Landscape of Formentera

The landscape, which used to feature the traditional dry-stone masonry walls that allowed the fields to be freed of stones for cultivation and to divide the plots among neighbours, is combined today with similar walls received with cement mortar and other types of walls which use unusual materials, such as prefabricated cement blocks

The salt flats have been a very distinctive place in the island since ancient times and an important means of subsistence for some of its inhabitants

(credits: F. Vegas, C. Mileto)

areas with a characteristic structural and functional configuration, and how they are perceived, which makes them unique and easily identifiable. After a long time, the individual units have acquired features which grant them internal coherence and distinguish them from neighbouring units. Therefore, landscape units are defined taking into consideration the combination of natural and anthropic elements which confer a unique appearance to each area outlined.

Four groups of elements, making up the different landscape units in Formentera, have been established. Three of these are natural factors while the fourth is a human factor. Each of these elements, identified by a code, can reflect subvariants which define a piece of territory more specifically. These are water resources (salt pans, pools, coast, currents, etc.), topography (flat areas, hillock, slope, etc.), vegetation (shrubs, forest, crop fields, etc.) and construction (compact population nucleus, scattered construction, etc.).

In addition, the landscape includes a series of areas or elements deserving particular attention due to their environmental, cultural, heritage, visual and social interest. These have been granted some degree of protection (either declared or in process) or are positively viewed by the local society as landmarks on the island. These are landscape features, classified according to the values which underlie them, with each individual element associated to a given landscape unit.

Heritage landscape resources, witnesses to the societies which have occupied the island, can be found in different parts of the territory. Distinctions are made between lighthouses, watchtowers, churches, mills, caves and archaeological sites.

This analysis of Formentera has identified nine landscape units with a defined structure and visual coherence: Promontorio de La Mola (LU-1), Itshmus (LU-2), Crop fields (LU-3), Urban axis of Sant Francesc de Formentera (LU-4), Cap de Barbaria (LU-5), Can Marroig and surroundings of Cala Saona (LU-6), Salt pans and pools (LU-7), Playa de Ses Illetes (LU-8), and S'Espalmador and s'Espardell (LU-9).

Main types of traditional buildings

Furthermore, there are several main morphologies and types of buildings in the island, namely *casaments*, auxiliary constructions, slipways, mills, places of worship, towers and watchtowers. The *casaments* are the traditional dwellings in Formentera. The name *casa* is given to each of the rooms, so that a *casa* for sleeping and a *casa* for living and cooking make up a simple *casament*. The basic *casament* in Formentera was a single rectangular space, known as a *porxo*, where all human activity took place and which originally had even been shared with livestock. At one end of the space, usually the left, the hearth, which also functioned as a cooking area, was located. As the available means or needs increased (due to the growth of the family unit), so did the dwelling. However, instead of being extended at the front, initially these dwellings were extended at the back, adding one or two (or at times even three) rooms which were used as bedrooms so that the original *porxo* was still used for shared activities. These early constructions were built with two-leaf masonry walls bonded with earth mortar. The inside walls were completely rendered in lime, while outside it was common to only render the main façade, and leave the rest in bare stone. The roof was flat, with a minimal indispensable slope. The juniper joists were bridged with shingles (*tegell*), and covered with seaweed (*posidonia oceanica* seagrass), earth and clay. Regular maintenance and replacement tasks using this clay were necessary to guarantee the watertightness of the roof, which also had wooden gutters.

Furthermore, in a subsistence system, dwellings were only one of the types of buildings present on the plot. Around these, different constructions could be found, fulfilling different functions and allowing inhabitants to be self-sufficient. Each plot was clearly delimited by stone walls and could include various auxiliary constructions such as storage yards, ovens, wells, cisterns, etc. The materials used in these constructions were like those of dwellings – stone walls and simple roofing systems.

In the shore, the need to house the boats (*llaüt*) at the end of the day led to the appearance of slipways, where the different fishing gear was stored. These were located in areas such as small coves or natural ports, sheltered from breaking waves. Although they can appear individually, these constructions are usually found adjoining others, forming lines along the coast. Regardless of the building solution used, the slipways could be slopes or ramps which the fishermen used to beach and launch their fishing and leisure boats. The highest section of the ramp often included a shelter to protect the boats from bad weather and storms, while also providing a space for maintenance tasks.

Another type of traditional buildings are the mills. When salt mining and agricultural activities were the economic driving force of Formentera, different mills necessary for these production activities were found throughout the island. The old animal-powered flour mills were soon replaced by windmills which used the territory's exposed orography to their advantage. The mills conserved in Formentera share the same building typology and milling mechanisms, with a characteristic cylindrical or slightly truncated tower with six sails. The tower's diameter is determined by the size of the mill stones, as the miller required a small corridor to move around the mill stones.
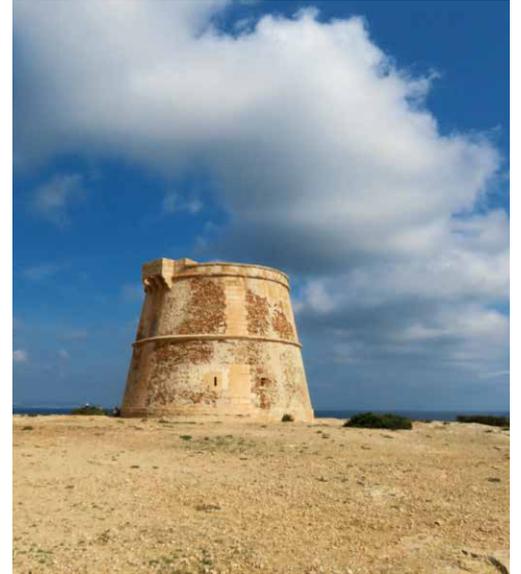
Church of La Mola in Formentera, founded in 1784, with its distinctive entrance porch

The old windmill at La Mola, one of the remaining witnesses of pre-industrial activities on the island, which was also studied and drawn during the VerSus+ workshop

Torre de Sa Punta Prima, one of the five characteristic defensive towers of the island

(credits: F. Vegas, C. Mileto)

opposite page
Sa Senieta, a significant example of the traditional houses of the island, known as *casaments*, which was chosen as an object of study and project during the VerSus+ workshop

(credits: F. Vegas, C. Mileto)

Other public buildings are the places of worship. In Formentera there are several religious buildings for the celebration of liturgical events by inhabitants. After the repopulation of the island in the 18th century these were built for the inhabitants, except for Sa Tanca Vella, which appears to have been built before that date.

Being a tiny island, towers and watchtowers were important for protective reasons. Formentera has five towers and watchtowers built along the coast following the repopulation in the 18th century (circa 1762). Four of these are on the main island and another is on the small island of s'Espalmador. These circular towers characteristically have a slightly tapering truncated cone shape, with two floors and an upper platform delimited by a continuous parapet.

Building techniques

The main building techniques in the island are simple techniques which did not require a complicated learning process, and thus the agricultural labourers were able to build and repair their constructions themselves.

The vertical structure of traditional architecture in Formentera is mostly based on the use of stone, either dry stone or combined with earth and/or lime mortars. The stone used in the construction of these walls is usually soft limestone or masonry or slabs of Marés. It is very common to use stone extracted from the plot itself when preparing it for cultivation. In a few cases, on the slipways it is possible to find walls of wooden boards or reeds nailed or tied to a basic round log structure. Whenever existent, the rendering of vertical walls consists of the application of successive layers of lime mortar until the desired appearance is achieved. Given the high number of hours of sun in Formentera, it is essential to use shading systems in doors and windows, such as shutters or curtains made of vegetable fibres. Both traditional floors and ceilings are usually built of round juniper or pine logs, although in recent times the use of rectangular sections has become common. The space between the beams is filled with different materials, mostly wooden slats or Marés stone slabs. But there are also several types of vaults

and domes on the island: vaults in Marés stone covering spaces with a limited span, such as cisterns; masonry vaults forming false domes; brick vaults, as seen in the more recent oven constructions; and ashlar vaults, which are found in the island's defensive towers. The paving evolved from compacted earth to the later addition of lime and stone slabs and ceramic biscuit tiles. Occasionally, floors of wooden boards are found in the attics of the *casaments* as well as in windmills. Stairs on the island are wooden, used to access attic sections, or stone, with ashlar built into the walls and projecting from them, or with masonry. The traditional hearth, built with Marés stone slabs, was used both for cooking and for heating the space. In order to prevent water from coming into the house, the chimney was protected with two pieces of Marés stone forming a small roof.

The flat roofs of Formentera, a typical architectural feature, use Posidonia seagrass as thermal insulation, covered with a layer of clay for waterproofing. These terraces have been partly replaced by sloping tiled roofs since the latter were introduced to the island. Other solutions sometimes found are the use of wooden boards or branches for the roofs of the slipways or the porches, or conical reed roofs for the hoods of the windmills. Another type of roofs are the porches. As the traditional *casament* evolved and grew, the first exterior porches started to appear. The initial structures were simple pergolas made of logs and branches which later evolved into more complex solutions, following the introduction of tiles in the 19th century.

🔽
Marés **stone slabs** used for the construction of the dividing walls of a traditional house
(credits: F. Vegas, C. Mileto)

⬆
An artisan weaving fabrics with her loom that she will later sell in the local market

A dry stone wall craftsman sharing his know-how with architecture students

(credits: F. Vegas)

Intangible heritage

The island still conserves the trade of construction in stone, which is carried out by several local artisans. The demand for the construction of dry stone walls at times exceeds the existing supply, so that more recently these jobs have been left in the hands of immigrant workers from other countries. Other general construction tasks survive, such as mortar rendering, although often cement mortar is used instead of lime mortar.

Other trades related to the local building traditional have practically disappeared. This is the case of the quarrying of Marés stone, the collection and spreading of Posidonia seagrass on roof terraces, the sourcing of ash from charcoal production spread over the seaweed, or the identification, extraction and spreading of clays for outer waterproofing.

Despite the predominance of tourism-related activities which take up most of the year and much of the time of the local residents, some agriculture and livestock farming is still active. It is still possible to see cultivated fields, wandering herds of goats or fig trees whose branches are spread out over the ground and propped up, which not only produce figs and provide shade, but have themselves become a symbol of the island's culture.

Furthermore, historically, sea fishing has always been a major feature. In domestic terms it still partially survives despite the considerable tourist activity, which also resorts to boats, although for leisure rather than fishing purposes. The tuna fishing practised years ago has disappeared. Boats are no longer built in wood, but imported and made with other materials.

Other traditional trades were salt mining or the production of esparto cords. The trade of extracting salt from the salt pans disappeared along with the last of the older generations who worked there until they

were closed in the Eighties. Animal-powered or wind-powered mills also fell into disuse and were replaced by electric power. The production of esparto is also another nearly extinct activity which is occasionally observed with rare demonstrations from artisans who have recovered it.

Nowadays, feasts, dances, traditional costumes, decorations, etc., on the island are still usually associated with the ecclesiastical calendar or saints' day celebrations. They live on in local traditions, deeply rooted in the popular culture. These events, as well as the whole summer season are populated by other artisan trades that have appeared, such as designer jewellery for the tourist trade, with simple examples sold at island markets, and other more notable ones of international renown, such as Mayoral, or the production of objects, toys and souvenirs of the island.

VerSus+ strategies applied

During the development of this project and the workshop held on the island of Formentera in spring 2023, the four major groups of knowledge transfer strategies designed for the project were applied. These were research and documentation strategies, community engagement strategies, education strategies, and dissemination strategies.

Some research and documentation strategies have been undertaken. The traditional architecture of Formentera has been studied, along with the construction materials and techniques used, as well as the location and morphology of its dwellings and production buildings. Interviews have been carried out with artisans and artists on the island, especially those with links with the vernacular tradition through their work or inspired by it. Graphic surveys have also been carried out on some of the more unique buildings in Formentera: Can Ramon and Sa Senieta, both foundational dwellings on the island which will themselves become ethnological museums, and Molí Vell de la Mola, one of the typ-

ical island windmills.

The community engagement strategies have consisted in the interviews and recordings obtained from several of the artists and artisans of Formentera, which have given them a chance to reflect on their work and become more aware of its importance, bridging local tradition and the future. The seminars, conferences and roundtables organised as part of the workshop not only provided information to the residents, but also gathered them in a single room to show them the objective of the project.

Education strategies have included the seminar and the several educational workshops. This seminar, with daily conferences taking place during the workshop was indubitably educational, both for the residents and for the workshop participants from other countries. Several educational workshops at a high educational level were also organised. These consisted in the repair and reconstruction of a dry stone wall under the guidance of a local artisan who was able to express the extraordinary value in landscape, functional, human and economic terms of the thousands of kilometres of low dry stone walls on the island. Another workshop was carried our involving the creative upcycling of waste collected on the beach, thus raising awareness on the need for waste prevention, as well as a workshop on the *VerSus* sustainability principles. In addition, a game with card families was designed and manufactured to show how to match the island's landscape units with its most characteristic buildings, construction techniques and materials.

While these activities, which were both practical and recreational, contributed to the dissemination of sustainability principles inherent to the vernacular tradition, an international competition was also organised, with the participation of artisans and artists whose work took some form of inspiration from local culture and tradition, and with an internationally renowned judges' panel. The works selected

were included in an exhibition for the duration of the workshop and the prizes were awarded on the final day. The celebration of this workshop was widely promoted in the local press, radio and television, as well as on social media, and as a general rule the *VerSus* project is following the same dissemination strategy through its webpage, Instagram, Facebook, YouTube channel, articles and books.

Lessons on sustainability

This in-depth study of life in Formentera has shown how the island's vernacular tradition provides a great many lessons on sustainability which can be extremely useful for the future. The strategies implemented for the transfer of knowledge to society have ultimately confirmed the need to highlight this message within society. Residents, specialists, artisans, artists, children, young people and students were the first to be amazed when they became fully aware of both the sustainability values of vernacular culture and tradition and their potential application in architecture and contemporary artistic manifestations.

A small island such as Formentera has had to become self-sufficient in order to survive, reinventing its adaptation to the climate and geographical setting, reducing its dependence on outside raw materials and taking advantage of all the means at its disposal, recycling them when necessary. A unique example of this is the island's flat roofs, which use the ash from the traditional charcoal production in combination with Posidonia seagrass and local clay to produce the layer of waterproof insulation used on these roofs. Another example is the use of widely available stone found in the construction of low dry stone walls and load-bearing walls for buildings, which also frees up fields for crops. Other examples include the many benefits from fig trees, with their branches spread out and propped up,

↑
People playing with the cards of The Seven Families

Students surveying local dwellings on the island of Formentera

(credits: F. Vegas, C. Mileto)

thus multiplying both fruit and shade, or the traditional balance between agriculture, livestock farming and fishing, which over the past centuries has allowed the people to live uninterruptedly on an island with few resources.

The aim of the *VerSus+* project has not been the discovery of any novelties pertaining to sustainability in the vernacular tradition, but rather to highlight the principles underlying the island's ancestral culture, seeking ways to transmit these values, providing the municipality and institutions with tools which will also allow them to transmit this knowledge and awareness anew, appealing both to residents and visitors to the island.

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Traditional access porch to the casament
(credits: F. Vegas, C. Mileto)

SANT'ANTIOCO: CULTURAL HERITAGE AND SUSTAINABILITY

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Environmental and socio economic-context

Connected to Sardinia by an isthmus built by the Carthaginians and improved by the Romans, the island of Sant'Antioco is off the southwestern coast of Sardinia, Italy. It is a volcanic island with large areas of limestone and Quaternary deposits on the east coast. The western part of the island is characterised instead by vertical or very steep cliff faces, interspersed with numerous inlets.

The climate is Mediterranean, with long, dry summers and mild winters. The average annual temperature is 21 degrees, with 250 mm of rainfall per year.

The presence of the sea has always strongly influenced this area. In addition to being a valuable resource for the economy, which has historically been based on fishing, the sea is an essential part of the local culture, giving rise to customs, myths, routines, and a way of life. Even the name of Calasetta, the town located on the northern tip of the island, is linked to the sea. It derives from 'Cala di Seta', and refers to byssus, a silk-like filament obtained from the *gnacchera*, or *pinna nobilis*, once abundant in the surrounding sea (Rombi, 1988; Cabras, Rivano Poma, 1992).

The island hosts 10,600 permanent residents and about 10,000 visitors in the summer. Fishing, salt cultivation, agriculture, and especially winemaking are the main historic economic sources. Although tourism now accounts for a significant portion of the economy, traditional local production and small handicraft workshops dedicated to weaving, byssus processing, and wooden boat manufacturing still persist.

Cultural landscape

The island of Sant'Antioco has a hilly topography that is characterised by Mediterranean scrub with low-growing plants, such as juniper, myrtle, lentisk, rosemary, and dwarf palms, as well as vineyards and arable land that is cultivated to produce wheat and legumes.

The Piedmontese colonists who arrived in this area in 1773–1774 introduced the system of grape cultivation and wine production, which has characterised the island's economic development and cultural landscape in a profoundly balanced relation with the territorial and environmental context.

The nature of the sandy soil has made it possible to cultivate the ungrafted vine without resorting to American vine grafting. This rare cultivation technique brings several advantages to the plant, such as greater drought resistance, longer vineyard longevity, and a better vegetative-productive balance. The

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Digital survey of of the Perdas Nieddas tuna fishery located in punta Maggiore, Sant'Antioco
(credits: CHM_Lab)

Carignano vine, which is cultivated without external support structures, is highly resistant to sea winds, which has enabled it to be planted in the sandy, sunny soils of Sant'Antioco. Traditional methods, such as treating the vines with sulphur and copper, fertilising them with manure and fava beans, weeding by hand, and using green manure, are still employed.

The vineyards occupy large portions of land, bordered by fences made of blocks of trachyte, a local rock of magmatic origin, long and narrow in shape (about 30 x 150 cm), positioned at about 2 m from each other. The stone blocks, locally known as *Sschèn,* are connected to each other by reed screens, which serve to protect the plants from strong winds. Prickly pear plants were often placed at the edge of the vineyards, also serving as wind shields.

In terms of biodiversity and the valorisation of small territorial productions, the production of black lentils (*Lentiggia naigra de Cadesedda*) should be mentioned. The lentil was imported from the Tunisian coast island of Tabarka by the *Tabarchini,* who are ancient Ligurian settlers from Pegli who were moved there in 1544 by the Genoese Lomellini family and were known for their coral-fishing prowess. Forty-eight of these *Tabarchini* families arrived to colonise the island of Sant'Antioco in 1770 and settled there to practice agriculture and farming. The black lentil was planted in the centre of the rows of vines once vine cultivation was widespread throughout the entire agricultural area. The lentil was cultivated as a source of protein and also used by farmers as an exchange for fish products and a method to improve soil fertility. At risk of extinction in 2017, the production of black lentil has increased, thanks to a regional announcement that resulted in the creation of a protection community, from 50 kg in 2019 to 100 kg in 2020, grown by 10 farms, three of which are organic.

Traditional rural dwellings

The traditional rural dwelling (known as *Baracca)* is a small (25–30 m²), rectangular, single-cell volume, almost always located at a corner of the agricultural plot. These tiny structures served as a winter base for farmers and a summer residence for the entire family which moved from the town to the countryside. A wooden mezzanine (*saié*) divides the internal space of the hut into two levels, separating the living area from the sleeping area. The mezzanine, which is accessed by a wooden ladder, is built at the bottom of the space, where the useful height is higher due to the roof's slope.

The openings are limited and small in size. The access door is often positioned on the main front, facing south-east. In many cases, a single small window on the north-west side, placed at a height above that of the loft, ensures effective cross-ventilation.

The chimney, which was typically placed on one of the side walls, allowed for cooking and heating the space. A cistern (*ciassè*), typically located against the outside wall, provided the water supply by collecting water from the roofs through a system of downpipes.

The walls have an average thickness of 50 cm and are made of red-brown volcanic stone (*ignimbrite*) bonded with a clay-based mortar.

Due to the lack of tall trees, juniper wood or salvaged timber gathered from the beach were employed. The roofing, made of brick tiles, generally rests on a mat of woven reeds.

Generally isolated within the plot, it is also possible to find typologies with several huts joined together, generating a housing stock. In some cases, additional auxiliary volumes outside the hut have been observed housing little farm animals.
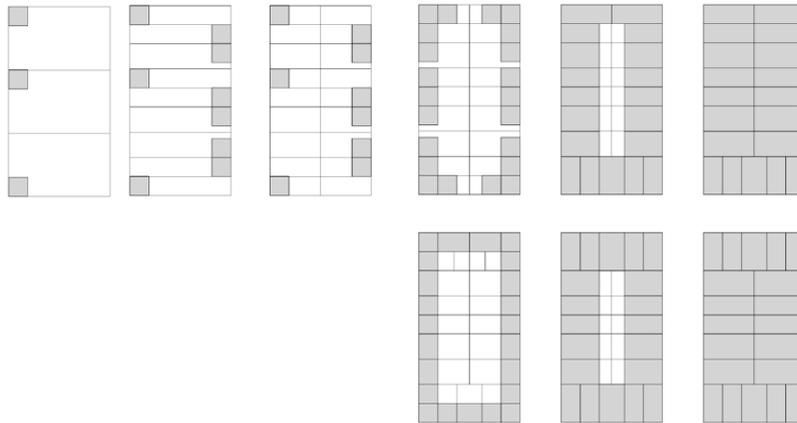
A rural dwelling
(credits: L.Dipasquale)

Urban morphology and development

The island of Sant'Antioco is known since pre- and early history, as testified by the many Nuragic and Phoenician settlements and necropolises. After the Roman period it was abandoned for many centuries, due to the frequent raids by Barbary corsairs, until the middle of the 18th century when the village of Sant'Antioco began to be repopulated (Vacca, 2009).

Calasetta is among the new lands founded by command of the House of Savoy in order to populate and protect the territory of Sulcis-Iglesiente from corsair raids. The layout of the city was designed between 1770 and 1771 by artillery lieutenant Pietro Belly (1731-1791) and is characterised by a Hippodamian grid structured on two mutually orthogonal guiding axes; the main N-W/S-E[1] route (via Roma[2] for a total length of 108 *trabucchi*[3]) is countered by a S-W/N-E route (via Guglielmo Marconi, with a lenght equal to 54 *trabucchi*); both axes have a width of 3 *trabucchi*, while secondary roads have a width of 2 *trabucchi*.

The church and the great cistern are located in the main square (24x12 *trabucchi* = 6 *stari*), while the supply storehouse (2x9 *trabucchi*) is located along the southern limits of the settlement.

[1] The settlement is rotated 45° with respect to magnetic north.
[2] The toponymy used in the text is the current one.
[3] The *trabucco* is an ancient unit of measurement used in Piedmont until 1818 that corresponds to 3.082596 metres and can be divided into 6 *piedi* measuring 0.513766 metres (Martini, 1883).

The 39 plots, assigned to the first thirty-eight families that settled there (Schirru, 2013), are of different sizes depending on their location within the settlement:

- 5x8 *trabucchi* along the long sides of the square, on via Marconi and via Tabarkini.
- 4,5x9 *trabucchi* on the S-E side of the square,
- 9x5 *trabucchi* on via Solferino.

Within the plot is the dwelling itself (square in plan and with a side equal to 1.5 *trabucchi*) located at the corners of the properties, while the rest is left to arable land[4].

The arrival of new settlers made it necessary to extend the settlement. The Expansion Plan, drafted in 1773 by the Savoyard engineer Lieutenant Giovanni Francesco Daristo (?-1777), increased the available lots by only partially complying with Belly's layout.

A comparison of the two plans reveals the following:

- a different distribution of secondary routes, especially along the N-W/S-E expansion axis (via Roma), which determine the structure of the typical block in Calasetta (8x15 *trabucchi*),
- the relocation of the parish church to a second square placed along the main axis[5],
- the setting of the defensive walls (two irregular and mirror-like pentagons) provided with six bastions[6].

In the mid-19th century, the building fabric still consisted of scattered houses aligned along the streets of the 18th-century layout. The surveyed area, between the Savoyard Tower and via Savoia, was settled between the late 19th century and the early years of the 20th, following the same plan layout set by Daristo.

From the reading of the current context and the analysis of the historical iconography it is possible

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[4] A differnet metrological reading to that of Schirru (Schirru, 2013) is proposed.

[5] This proposal was also later discarded, and the first core of the present religious building was constructed between 1838 and 1840 in what is now Piazza Gautier (Cabras, 2010).

[6] It should be noted that in both the Belly and Daristo projects the tower is incorrectly placed.

to deduce the process that led the early sparse fabric to turn into a 'dense' fabric of terraced houses in which every block presents along the whole perimeter a continuous street-front construction.

Once the agricultural function was lost, every plot was first divided transversely into rectangular plots (phase 1) and then, presumably at a later moment (phase 2), also divided longitudinally.

Throughout the decades, the alleys that led to the plots (phase 3) were gradually incorporated into the buildings. The original dwelling cells were extended both in depth (at the expense of the appurtenance areas, phase 4 and phase 5) and in height (with the addition, in general, of only one storey).

The building type in an urban context

It is likely that the original housing cell located within the plot consisted of a single room covered by a sloping roof directed toward the farmyard, from which the building could be accessed. At an initial stage, the urban building type must not have been much different from the rural one, a configuration that changed radically when, once the productive function of the lots had ceased, the dwellings (phase 1) opened onto the public street. This important change had two relevant effects: a different direction of the slope and the creation on the street front of a sort of 'veil', or 'veletta', consisting of an extension in height of the facade in order to conceal the pitch of the roof. There may be more than one reason for the presence of this element, which still characterises the architecture of Calasetta today: the saving of both time and costs obtained by avoiding the complete demolition of the upper part of the original rear wall; the advantage of having an *impluvium* to channel water to a possible cistern; and the wish to maintain the same street-front appearance (with the exception of the entrance door to the houses) which had been consolidated over time.

The possibility of extending the cell both in length and height brought about early variants to the original type.

In the least articulated version on the facade there are three openings: on the ground floor there is an access door and a window that illuminates the living area, and on the first floor there is an additional
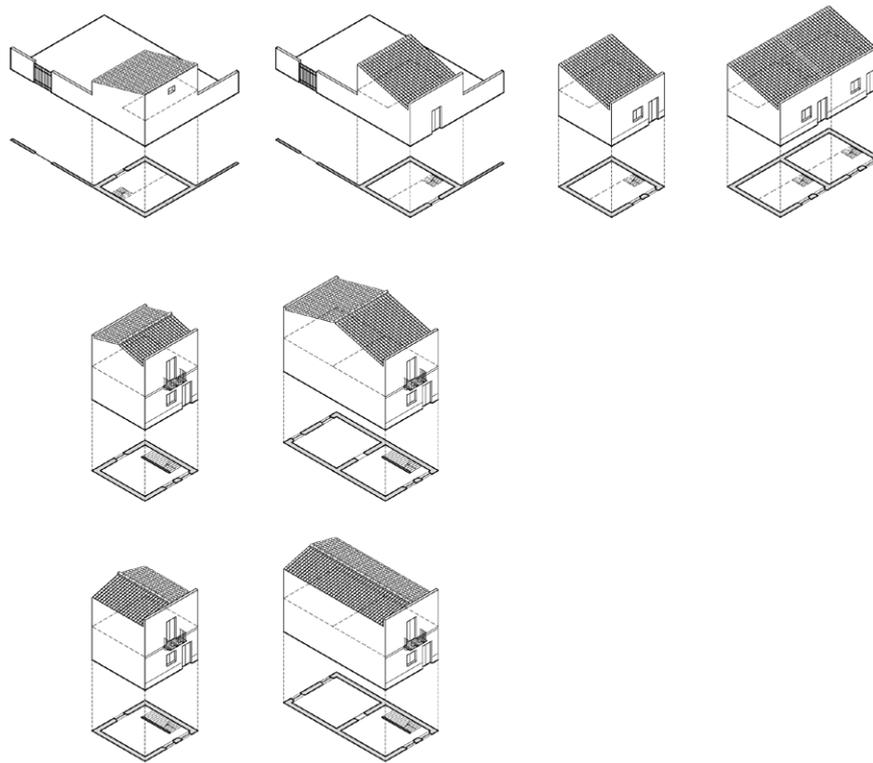
window located in the center of the wall (in some cases a French door that opens onto a small balcony supported by three corbels) which provides the sleeping area with light.

The internal staircase, aligned with the front door, is usually very steep (a typical feature of Genoese *fondaco* storehouses; Caniggia, Maffei, 2008) in order to limit its overall dimensions.

The building material consists of ignibite blocks from open-pit quarries in the proximity of the settlement, some of which are still visible today. The exterior stone masonry, covered with lime mortar and dyed in pale colors, has a skirting approximately 60 cm high, made of larger ashlars and a different colouring of the surface finish.

An articulated rainwater collection system, where present, fed rainwater to cisterns excavated in the rocky mantle below the dwelling. The kitchen area generally included a fireplace, used for the preparation of food and heating the dwelling, and a connection to the water supply from the cistern.

The main change introduced over time concerns the roofing system. A single pitch was sometimes preferred to a gabled roof, and this was usually built together with the vertical extension of the dwelling. The two pitches[7] can be positioned perpendicular to the street, or else be arranged parallel to it[8];

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[7] The two pitches are supported by a timber frame consisting of main rafters and secondary joists placed at intervals equal to that of the tiles and counter-tiles that form the roof covering. A false floor slab of reeded roofing separates the attic from the room below, thus providing a better microclimate within the dwelling. In many cases the traditional tiles and counter-tiles have been replaced by Marseille tiles.

[8] In interventions that are more respectful of tradition and of the consolidated image of the urban context, the *veletta* has
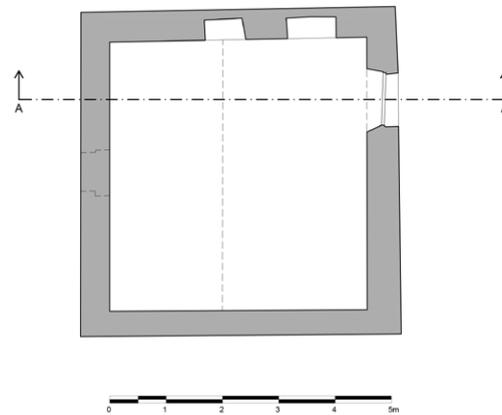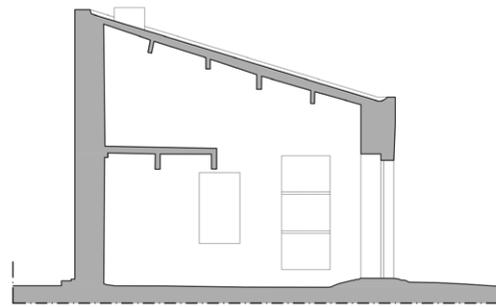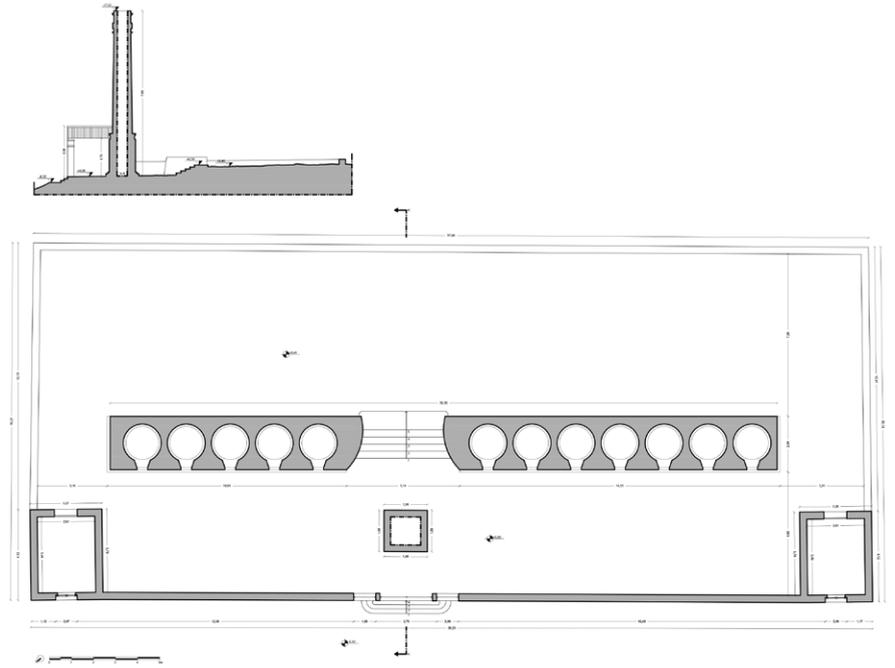
the second solution provides an undoubted advantage: by having rainwater flow into gutters and downspouts facing their own plot of land or the public street rather than in the direction of the spine walls between the two buildings, it avoids possible disputes with the neighbours.

The increase in floor area gave rise to further variations of the original type[9]: in many cases the building became a multi-family dwelling, accommodating one apartment on each storey; the number of openings on the upper floors increased, usually to two per floor, distributed along two vertical axes.

In addition to residences, the lots also include warehouses or spaces suitable for storing tools and/or sheltering animals. These structures, of the same size as the basic cell, are single-storeyed and are covered by two pitches that are perpendicular to the road. The main facade is characterised by a single large archivolted opening with a double-panelled wooden gate, located in the center of the plastered wall. In order to ensure a greater functionality and adequate ventilation and lighting for these rooms over time, the gate was replaced with a rectangular doorway and a window.

The Savoyard tower

At the top of the hill overlooking the town, at the end of Marconi Street, stands the circular tower known as the 'torre Sabauda', or Savoyard tower (also known locally as the 'tower of the French' or the 'civic tower'), whose construction predates the one at Terranova (1746; Marongiu, 1977).

The structure, which has a diameter at the base of 16.21 m, and 14.03 m at the top, with a total height of 14.20 m[10], served both as military stronghold and watchtower. The wall is composed of uncut trachyte

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been reconstructed, which, in the case of pitches parallel to the road, has sometimes been erected above the last row of roof tiles, which, therefore, protrude from the main facade, thus resulting in an 'peculiar' crowning element.

[9] Over the past decades, a rather flexible building regulation has allowed the indiscriminate use of incongruous materials in doors and windows and in wainscoting, as well of shading systems that do not belong to the local tradition, the installation of eave gutters on the main facades, and the construction of balconies using improper techniques, which have in part compromised the distinctive features of the Calasettan building tradition.

[10] Measured from the floor level on via Regina Elena, in axis with the second floor access door.

↑
3D model, plan and section of the Savoyard tower
(credits: CHM_Lab)

stones of different sizes with horizontal recursions. Restoration interventions carried out to repair collapses, as well as tampering of the structure due to the enlargement of some windows and the probable reduction of the total height, are evident on its surface. A skirting made with ashlars larger than those above characterises the connection of the tower to the ground, while a projecting reinforcing rod can be seen at its top.

Access to the tower is placed at a height of 6.50 m, so as to make the tower impregnable in case of a siege. Six small embrasures suitable for firearms open in the wall thickness, which varies from 3.70 m to 2.60 m. The structure is divided into two levels: the lower one, accessed through a door added during the restoration works in the Eighties of the 20th century, has the natural rock as pavement, from which a central pillar rises forming three arches that support the new timber floor above. On the left side of the door there is an opening connecting to the water cistern.

The upper level, also divided by a spine wall, is covered by a two-coloured limestone 'basin' vault that supports the last floor, which is accessible by way of a stone staircase carved into the wall thickness and covered with a rampant barrel vault[11].

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[11] Since 1875, the tower and the surrounding state land have been the property of the municipality of Calasetta. The ground floor of the tower currently houses an archaeological museum managed by the Macc foundation; the upper level, which is divided into three different rooms, is used for ceremonies or temporary exhibitions.

Perdas Nieddas tuna fishery

The Perdas Nieddas tuna fishery, located along the longitudinal axis of the promontory of Punta Maggiore in a North-Northwest/South-Southeasterly direction, is a complex that has been abandoned since the beginning of the 20th century, yet still preserves the remains of buildings for the processing of tuna caught in the nearby waters[12].

In the documented area there are two small buildings for the storage of salt, two sets of stoves for cooking the raw material, and the smokestack, which skillfully combines the use of brick elements, special pieces, and sandstone blocks.

The two sets of stoves, 11.40x2.43 m and 15.08x2.43 m partially buried parallelepipeds, have five and seven holes, respectively, which open on the horizontal surface into large circular vents; metal receptacles were placed in these vents containing the chunks of tuna. On the only long side above ground and at each opening there was a hole for feeding wood to the fire, while also serving as an air intake. On the opposite side, a further hole served instead as a forced draught, allowing combustion fumes to be channeled through underground pipes to the smokestack, where, thanks to the chimney effect, they were expelled at a height of 7.52 m.

Intangible heritage

The intangible cultural heritage in Sant'Antioco includes a wide range of traditional knowledge and practices concerning the management and conservation of natural resources, including traditional agricultural techniques, the balanced management of the land to prevent erosion and ensure agricultural production, and the processing of products derived from agriculture and spontaneous vegetation. The island's Mediterranean scrub is a resource for producing not only crafts but also food products: the mastic tree, for example, was used to produce oil, which was consumed when olive oil was not available; from the dwarf palm tree, traditional brooms of various sizes are still produced today, by processing and plaiting its dried leaves.

The cultural identity of Calasetta was influenced by the cultures of the Genoese and Piedmontese populations who founded and inhabited the city. The commonly spoken language is the *Tabarchino* dialect, which is a unique blend of Ligurian and Sardinian, inherited by the migrants from Tabarka who founded the city. The Tabarchino dialect finds expression in stories, popular songs, and serenades. Tabarkan traditional customs are also deeply rooted in the gastronomic traditions and popular festivals (such as the Feast of San Pietro and the Tuna Festival).

A valuable experience of enhancement of the Tabarkan culture has been conducted by the Millepiedi

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[12] The tuna fishery was built in 1772 under commission of Giovanni Porcile, captain of the Royal Sardinian Navy, yet its stopped operating after only one year. From the year 1773-74 it was granted to the Order of Saints Maurice and Lazarus, and despite numerous changes of ownership and incidents, it continued to operate until the second half of the 19th century. The buildings used for the processing of tuna were built during the second half of the 19th century. The present spatial distribution only partly reflects the way it was originally, because the large area where the nets were prepared and the boats were stored is now devoted private residential purposes (Contu et al., 2006).

association, which, in the framework of the project Raixe - financed by the Region of Sardinia - has created a permanent exhibition and a digital archive aimed at fostering the dialogue between the local cultural associations and providing a place for the sharing of memories, knowledge, and know-how. The five itineraries of the exhibition show the elements that represent the intangible heritage and the cultural identity of Calasetta: history, memory, cycle of life, cycle of the year, traditional crafts, and activities.

Versus+ strategies applied

In the framework of the *VerSus+* project, several research and educational activities have been carried out. Among these, the project partners UNICA and UNIFI have run a joint didactic programme that involved students of the Master Courses in Architecture at the two Universities. During the period of one semester, about 25 students were called upon to assess four main subjects: the local cultural landscape, the relation of the people with the sea, the living heritage, and the urban morphology.

The goal of the course for the attending students was to develop skills to analyse, understand, interpret, and communicate the local heritage values of a place that was still unknown. The course, attended jointly by the students of the two universities in a combined form (online and in-person classes), included an on-site workshop where the two groups came together.

According to the variety of the analysed topics, the activities ranged from interviewing artisans and producers, documenting some of the major activities on the island, such as agriculture, fishing and their related production, to analysing the architectural and urban peculiarities of the island and of Calasetta in particular. During the workshop in Calasetta, students and researchers interviewed local scholars, masters of dry stone walls, shipwrights who still preserve the art of making wooden boats, craftspeople

who make brooms from dwarf palm leaves, fishermen, grape and black lentil growers, serenade singers, and producers of typical gastronomic products. Four buildings, representative of Calasetta's cultural heritage, were surveyed using active sensors (laser scanners) and passive sensors (cameras for terrestrial and aerial photogrammetry) to produce graphic drawings and 3D models: a rural traditional building (*baracca*), a productive structure (the ancient trap of Calasetta), the Savoyard defensive tower of Calasetta, an urban building hosting a digital exhibition, and one of the main streets of Calasetta.

The tangible and intangible heritage was documented through sketches and technical drawings, videos, photos, and descriptive texts, which have been uploaded onto the *Heritage for People* Web App created as part of this project. The reported analysis served at the same time as the basis for the creation of serious virtual games. The four games set up in Calasetta by the students addressed the authentic spirit of the island in connection with the landscape, the urban settlement, the relation of the population with the sea and, finally, with the local living traditions. All games can be played by scanning with the cellphone a QR-code to be found in very frequented corners of the village. From there, a narrated story accompanies the player into the discovery of the history of the settlement, as well as of the peculiar traditions of the island, including a local language, music and songs called *serenate*, the art of shipwrights, and a wise, respectful use of the landscape for living and for production.

Lessons of sustainability

The analysis of the traditional tangible and intangible heritage of Sant'Antioco has given us the chance to understand the richness of its cultural value, which is the result of a skillful combination of resources linked to a limited geographical context and the ability to embrace diverse cultural influences. The

→ Local artisan working with Mediterranean dwarf palm
(credits: authors)

traditional architecture of Sant'Antioco harmonises with the environment: the few resources available are used sparingly and intelligently. The small rural buildings are adapted to the local climate: they have thick stone walls with high thermal inertia, a compact shape for reducing the surface area exposed to external temperatures and minimised openings to reduce heat gain from the intense summer sun. The position of the openings on opposite sides of the building – the south-east door and the small window to the north-west, Mistral wind direction – facilitates cross-ventilation, allowing cool breezes from the sea to pass through the interior spaces and promote airflow. Rural and often traditional urban dwellings incorporate rainwater harvesting and storage systems to supplement water supply during dry periods. The position of the plants within the plot is also designed to enter into a dialogue with the local microclimate. The use of locally sourced, low-transformation building materials not only reduces environmental impacts but also contributes to the architectural identity of the area. Handcrafted products made from the materials available on the island show expert knowledge of resources, great creativity in processing raw materials and developing circular processes, and a deep respect for nature. Simple but not obvious lessons in sustainability, in an era when saving resources and reducing waste are two mandatory rules to ensure the survival of biodiversity and of the next generations.

In an island where tourism is the main source of the economy, traditional architecture and cultural heritage can play a key role in a development that is more in harmony with the environment, society, and culture. Encouraging cultural and experiential tourism, while experimenting with forms of diffuse hospitality, could enhance rural heritage, which is currently largely abandoned or subject to processes of profound transformation that erase its identity features. But it can also generate new opportunities for young people and thus reduce migration. The intangible heritage, including the gastronomic and Tabarkan traditions that have survived over the centuries and still constitute important aspects of the identity of the place, must also be considered as elements to trigger innovative forms of tourism and social economy, capable at the same time of safeguarding the environment and the territory.

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The publication presents the results of the project 'Versus-Heritage for People', funded by the Creative Europe EU programme. The main aim of the project was to actively involve a broad audience and raise awareness among it concerning the value of vernacular knowledge in shaping more sustainable and resilient models of development. The material and immaterial elements constituting a vernacular heritage (encompassing local materials, construction methods, models for living and social interaction, technical and environmental knowledge for the management of territories, natural resources, settlements, etc.) have enormous potential for generating forward-thinking models that can improve the environmental and social quality of our habitats, foster a sense of identity and belonging, and relate in a balanced way to the capacities of our planet. The book explores strategies and tools for managing and transmitting knowledge and the values associated with vernacular heritage. It includes concrete examples and good practices for engaging people in processes of knowledge and the enhancement of vernacular heritage values for sustainability. The outcome is the result of the collaborative efforts between the five academic institutions involved in the project – Universitat Politècnica de València as coordinator (ES), University of Florence (IT), University of Cagliari (IT), CRAterre-ENSAG (FR) and Escola Superior Gallaecia at Universidade Portucalense (PT). A total of 63 authors, comprising both external scholars and professionals, contributed to the book.

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