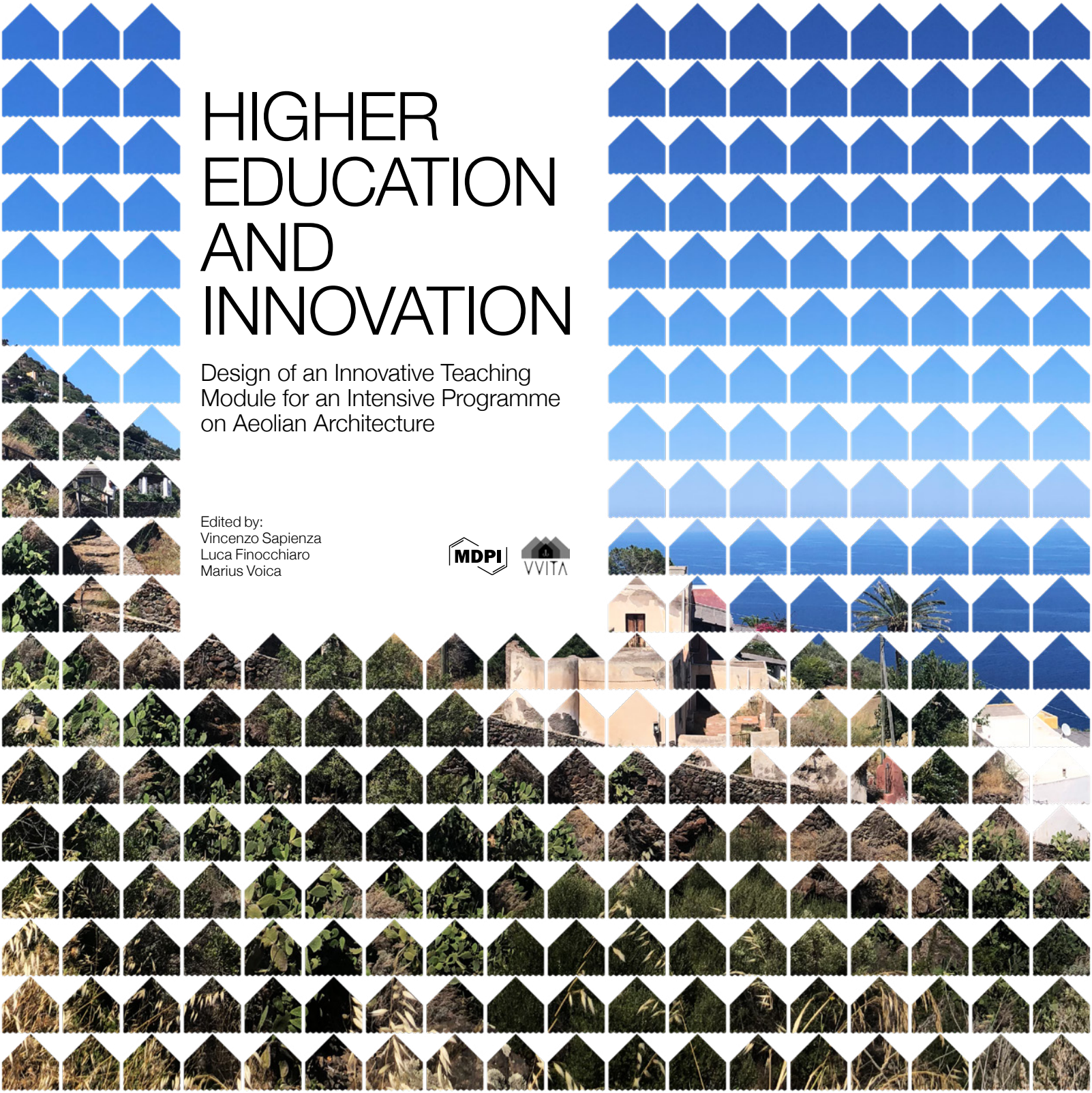


HIGHER EDUCATION AND INNOVATION

Design of an Innovative Teaching Module for an Intensive Programme on Aeolian Architecture

Edited by:
Vincenzo Sapienza
Luca Finocchiaro
Marius Voica

MDPI
VVITA

HIGHER EDUCATION AND INNOVATION

Design of an Innovative Teaching Module for an Intensive Programme on Aeolian Architecture

ACKNOWLEDGEMENTS

The authors acknowledge the research framework and financial support provided by the European Community, that has financed the project "Modernizing Learning and Teaching for Architecture through Smart and Long-lasting Partnerships leading to sustainable and inclusive development strategies to Vitalize heritage Villages through Innovative Technologies" – VVITA, under the programme ERASMUS+; key action KA2 – Cooperation for Innovation and the Exchange of Good Practices; action KA203 – Strategic Partnerships for higher education. The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Layout by Sebastiano Greco

HIGHER EDUCATION AND INNOVATION

Design of an Innovative Teaching Module for an Intensive Programme on Aeolian Architecture

Editors: Vincenzo Sapienza, Luca Finocchiaro, Marius Voica

Authors: Alessandra Bonazza, Simona Calvagna, Rosa Caponetto, Luca Finocchiaro, Antonio Gagliano, Mihaela Hărmănescu, Elena Cristina Mândrescu, Michele Mangiameli, Giuseppe Mussumeci, Gianluca Rodonò, Vincenzo Sapienza, Alessandro Sardella, Markus Schwai, Marius Voica

VVITA Participants: Chiara Bertolin, Ivo Caliò, Simona Calvagna, Luca Finocchiaro, Antonio Gagliano, Marina Mihăilă, Mihaela Hărmănescu, Elena Cristina Mândrescu, Giuseppe Margani, Adrian Moleavin, Gianluca Rodonò, Vincenzo Sapienza, Markus Schwai, Marius Voica

EDITORIAL OFFICE
MDPI
St. Alban-Anlage 66
4052 Basel, Switzerland

ISBN 978-3-03943-712-2 (Hbk)

ISBN 978-3-03943-711-5 (PDF)

doi.org/10.3390/books978-3-03943-711-5

CONTENTS

INTRODUCTION

The present book shows the first results of the project VVITA.
VVITA is the acronym of "Modernizing Learning and Teaching for Architecture through Smart and Long-lasting Partnerships leading to sustainable and inclusive development strategies to Vitalize heritage Villages through Innovative Technologies". It is inserted in the Erasmus+ program, measure K2 Strategic Partnership for Higher Education. It involves professors and students of the Ion Mincu University of Architecture and Urbanism of Bucharest (UAUIM), which is the leader, the University of Catania (UNICT), and the Norwegian University of Science and Technology of Trondheim (NTNU).
The core of the project consists of three Intensive Periods (IP), each of them hosted in one of the country partners of the project. IP is a tool adopted in the Erasmus+ Program to encourage transnational teaching and learning of special subjects, through short courses in which involved are students and professors of universities of foreign countries, grouped in a Strategic Partnership.
The IPs of VVITA are addressed to develop innovative methodologies in the teaching of refurbishing and revitalizing local, vernacular architecture. Such courses are called Innovative Teaching Modules (ITM). For Norway, an ITM was in last June 2018 and it was located in Lofoten, an archipelago off the Scandinavian Atlantic coast, 70 ° N. For Italy, an ITM was in last September 2018 and it was in the Aeolian Islands, 32 miles off the Sicilian northern coast. An ITM in Romania was programmed for May 2019, in the Danube Delta, off the coast of the Black Sea. These places are very interesting; their peculiarity is the strong relation between architecture and coastal landscape. Unfortunately, they show wide marginal areas that are unexploited. Therefore, the project is addressed to the revitalization process of them, through architecture.
The ITM is composed by different modes: lectures, practice, and workshop. Each mode is connected with the others to form a system. In order to achieve this synergy, it is very important to have a careful design of the teaching module. In the contemporary view of this subject, binomial teaching-learning is considered indivisible, as well as the partnership between teachers and learners. The learning outcomes are strictly related to this relation, which is also the target of the teaching design.
The design of an ITM is the target of VVITA that is assigned to UNICT. In particular, this book deals with the generic design of an ITM and its contextualization in the module of the Aeolian Islands, called the Aeolian Teaching Module (ATM).
This book is composed of three parts.
The first one begins with a theoretical introduction on the didactic design, addressed to show how it is possible to strength the partnership between teachers and learners. After, it describes the characteristics of the VVITA project, the generic ITM, and a SWOT analysis of the ITM design.

Part II contains the design of the ATM; it speaks about the features of the location and describes the activities carried out there. Part III is divided in two sub-parts. The first one consists of the contributions of the staff involved in the ATM. In particular, it is formed by a corpus of propaedeutic lectures (on the particularity of the place, on the calculation of the comfort conditions, on the evaluation of the local building, and on the use of the GIS technology). The second half is formed by the final reports of the student groups, a contribution from each one of them. After a GIS analysis of the assigned area, they show the revitalization of the building chosen as the case study.

PART I

INTENSIVE PROGRAMME DESIGN

Gianluca Rodonò, Simona Calvagna

DIDACTIC MODULE

ABOUT THE UNIVERSITY'S DIDACTIC DESIGN

With regard to the pedagogic field, since the Bologna Process, learner-centered methodology (active-learning) has spread and developed [1, 2]. This methodology is based on the planning of learning outcomes; it has been adopted in the policy of the State Members of the EU and finally, in practice. Thanks to this, a new approach on teaching design has been broadly shared; it refers to constructivist theories (Piaget, Vygotsky) and contemplates strategies, methodologies, and actions addressed to the creation of profitable occasions of learning, rather than a mere transmission of contents.

Learning is the result of a succession of assimilation activities, with the related "adjustment" of learners that actively "build" their learning; therefore, it is no longer possible to think about learning as an independent action, related only to the ability of teachers to explain subjects. Thus, binomial teaching-learning is considered indivisible, as well as the partnership between teachers and learners.

The student is the protagonist of his learning and he is guided by the professor mediator in a process that leads him to the planned outcomes. Didactic design is aimed at defining the environment in which he progresses, thanks to the teacher's guidance and his active participation. The design defines the rules of the relationship between learners and teachers in order to have a prepositive dialogue, based on the learners' perceptions of the task assigned to them; it defines also teaching methods and evaluation modality, in order to compare effective learning outcomes with the planned ones.

This kind of approach, affirmed some decades ago in the international scenario, has been encouraged by the cultural debate in the European Community on the theme of higher education. Following this approach, the present university learning programs are addressed to define the outputs of the educational processes and the skills related to them.

In this context, the EU focuses on two strategies.

The first one is the intergovernmental agreement known as the Bologna Process [3]; it began in 1999 and has been signed by most of the representatives of the governments of the Old Continent, at different moments. Its aim is to give a response to the needs that emerged from the Agreement of Sorbonne (1998), to harmonize the European system of higher education, as a prerequisite to enhance international mobility. This target has been obtained by defining two cycles of the degree course (Bachelor and Master), which are completed by the course of Philosophiae Doctor (PhD). In the successive meetings, and especially in the Bergen one (2005), a framework for the qualifications of higher education was defined [4]. Every country listed there has promised to arrange its higher education system according to this document.

Among the main outputs, there are the Dublin Descriptors [5] that define five skills

of learning to acquire to have the correspondent license in the attended course:
- knowledge and understanding;
- applying knowledge and understanding;
- making judgements;
- communication skills;
- learning skills.

Apart from the harmonization of the structure of the courses and apart from the definition of the learning typology, the process has the goal to define a quality standard for higher education processes. For this specific aim, in Bologna, they defined standards and guidelines to assure the quality level of the higher education field [6, 7].

The second strategy of the European Community is out of the traditional educational system. It promotes an education strategy for the entire duration of life, which is called Lifelong Learning; it is both formal and informal. The document which promotes such strategy is the European Qualifications for lifelong learning (EQF) [8, 9], which provides indications on the qualification levels adopted as a guide for education systems. In this document described above, the qualification level depends on certified knowledge, competence, and skills.

Another project related to didactic design is Tuning [10], which has involved a number of European Universities under the financing of the European Commission. Its main output is a guide to program degree profiles, considering competence and learning outcomes [11]. It is possible to define the acquired skills as the ability of the learners to use knowledge and competence acquired in the attended course. The skills must be related to the learning outcomes. They are the result of the entire learning experience. The teaching staff can use them to verify if students have developed the competence related to the qualification level that the course aims at.

INTENSIVE PROGRAMME IN ERASMUS+

The idea of supporting the insurgency of a common European feeling through young mobility was born at the end of the sixties. Firstly, this idea was proposed by Sofia Corradi [12] (also known as "Mamma Erasmus"); she was a pedagogue and an advisor of the Italian Conference of the University Rectors (CRUI) that adopted and supported this proposal.

Thanks to this push, the European Community defined the first programme for young mobility in the field of education, training, youth, and sport. The program, which was triennial, was launched in 1987 and was called Erasmus [13]. This is the backronym of "EuROpean Community Action Scheme for the Mobility of University Students"; it refers to Desiderius Erasmus of Rotterdam (1466/69–1536), a Dutch philosopher and theologian who visited most of the countries in Europe, to understand costumes and cultures. For this reason, he became a model of European intellectual life during the Renaissance and he could be considered an icon of the European Union, still now.

After its birth, the mobility programme has continuously been renewed. Thanks to it, more than 3 million students have had the possibility of spending a semester in other countries (not necessary belonging to the EU).

An important tool introduced by Erasmus is the Intensive Programme (IP) of study. This kind of activity consists of a short course in which students and professors of universities of foreign countries are involved, grouped in a Strategic Partnership [14]. The goal is to encourage transnational teaching and learning of special subjects. The theme of the IP must be added to the ordinary curricular courses [15]. Before it begins, the university partners must declare the number of credits (CFU) the participants will get through their participation. This will be established according to the subject and the length of the IP, for specific degree courses. IPs are shorter than ordinary courses. They last from a minimum of ten days to six weeks.

An IP can be done once or it can be repeated for a limited number of years. It may not consist of research activities or conferences but should provide something new in terms of learning opportunities and skills.

The IPs were introduced with the Lifelong Learning Programme in 2007–2013 [16], which is the financial instrument available to the European Commission for its directly managed education and training policies, during the period covered by the European Union's current financial perspective. The Lifelong Learning Programme continued the main actions launched under previous programmes and has six sub-programmes [17]:

- Comenius;
- Erasmus programme;
- Leonardo da Vinci;
- Grundtvig;
- Transversal programme;
- Jean Monnet Programme.

Its objectives were first, to support the development of quality lifelong learning and

thereafter, to help member states of the European Union to develop their own education and training systems.
The programme supported three types of actions: connections between countries, exchanges between individuals, and exchanges between institutions. The IP is a sub-action of the third action.
The Lifelong Learning Programme was substituted by the Erasmus+ programme in 2014–2020, which maintains the structure of the previous one; it improves the number of sub-programmes and maintains also the possibility of the use of IPs.
The number of IPs required and realized has been increasing over time. In the last year, the European Community financed almost two hundred IPs only for Italy [18]. This is the measure of the success of the introduction of this tool.

Architectural and engineering subjects fit very well with the IP, because they allow the students to have direct knowledge of the sites and buildings with which they can be involved. In this case, it could be strategic to accompany the initial lectures with practice and workshops. With the first ones, you can contextualize the concepts in the local landscape or tradition; with the second one, you can address the attention of the students to the design or redesign, which is the first target of this matter.

European Union Programmes	
1986-1989	Erasmus
1994-1999	Socrates I
2000-2006	Socrates II
2007-2013	Lifelong Learning Programme
2014-2010	Erasmus+

ACRONYMS

ATM	Aeolian Teaching Module
CAD	Computer Aided Design
DDS	Decision Support System
DEM	Digital Elevation Model
DICAR	Department Civil Engineering and Architecture
EQF	European Qualifications Framework
EPI	Energy Performance Index
FOSS	Free and Open Source Software
GIS	Geographic Information System
GPL	General Public License
GPS	Global Positioning System
IP	Intensive Period
ITM	Innovative Teaching Module
NTNU	Norwegian University of Science and Technology of Trondheim
QGIS	Quantum GIS Software
REM	Rapid Evaluation Method
SWOT ANALYSIS	Strengthen, Weakness, Opportunity, Treats Analysis
UAUIM	Ion Mincu University of Architecture and Urbanism of Bucharest
UNICT	University of Catania
VVITA	Modernizing Learning and Teaching for Architecture through Smart and Long-lasting Partnerships leading to sustainable and inclusive development strategies to Vitalize heritage Villages through Innova tive Technologies
WMS	Web Map Service

BIOGRAPHIES

VINCENZO SAPIENZA
Department of Civil Engineering and
Architecture, University of Catania, Italy
Mail: vincenzo.sapienza@unict.it

Vincenzo Sapienza was born in Catania (Italy, Sicily) fifty years ago. He started working in the University of Catania in 1997, as a researcher of Building Techniques and now, he is an Associate Professor and Vice Head of his department. He is also Scientific Director of the Enabling Techniques for Architecture Laboratory (ETA Lab). Every year, he has covered a Chair related to his disciplinary competences.
His scientific activity is essentially divided into three thematic areas: innovative building technologies; building sustainability; history of construction.
He has carried out a number of didactic and research periods in foreign universities and in particular, in NTNU of Trondheim University, in Norway (November 2016) and in UAUIM of Bucharest (March, 2017), and UTM of Madrid (February, 2018).
He is on the editorial board of the journal MODULO (by Be-Ma Editor, Milan). He was the curator of a special issue, 38/2016, of ilProgettoSostenibile Magazine. Since 2015, he has been Associated Editor of the journal TeMA – Studies on Architectural Engineering.

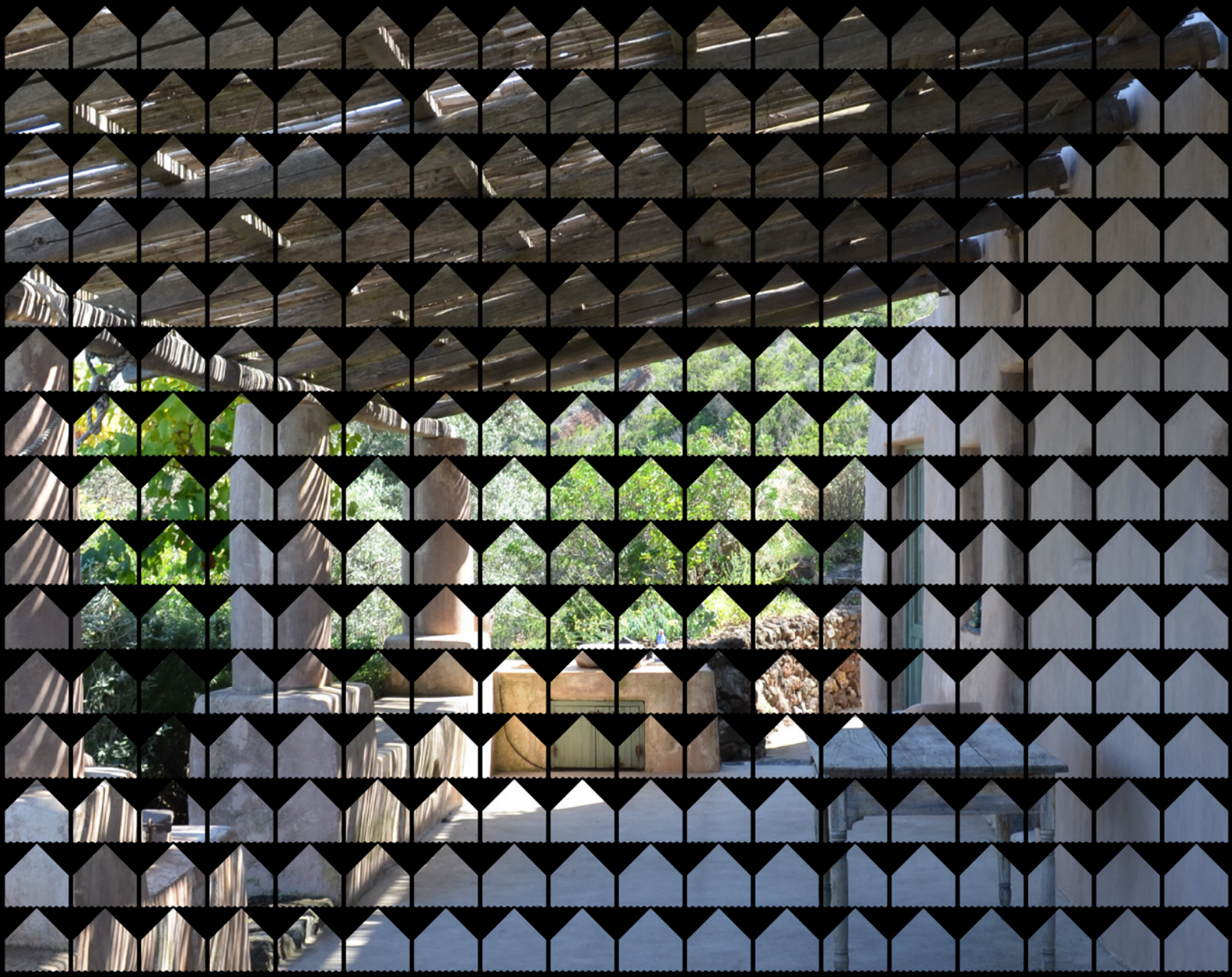
MARIUS VOICA
Department of Architecture, Ion Mincu
University of Architecture and Urbanism, Romania
Mail: mvoika@yahoo.com

Marius Voica received his Bachelor degree from "Ion Mincu Institute of Architecture" in Bucharest in 1996 – Faculty of Architecture and Urbanism. He finished his Master's degree in 1999, specializing in "Marketing in Architecture", and graduated from a post-university course in "Project Management".
In 2007, he received his PhD in Architecture with his thesis "Ecological Architecture: Tradition and Contemporary Technology. Sustainable Development and Ecological Management." He has been working in higher education in Architecture since 1998.
He was also manager of the "URBANPROIECT" branch within The National Institute of Research Development in Construction, Urbanism, and Sustainable Territorial Development URBAN – INCERC.
Currently, he works in architectural and construction management, and coordinates the "E.U. Research Funds Office" and the International Studio in "Architectural Synthesis" Department at the UAUIM.
He has attended scholarships, workshops, and teaching programs at universities in Karlsruhe, Regensburg, Montpellier, Stuttgart, Istanbul, and Vienna.
His activity in architecture, urbanism, and interior design has summed up to over 90 projects.

LUCA FINOCCHIARO
Department of Architecture and Technology,
Norwegian University of Science and Technology, Norway
Mail: luca.finocchiaro@ntnu.no

After earning Master's degree in Building Engineering at the University of Catania (Italy), Luca Finocchiaro moved to Scotland where he earned a Master of Architecture at the Glasgow School of Art. He worked in Barcelona twice, first as a visiting researcher at the ETSAB in UPC (developing his PhD thesis in bioclimatic design of hospitals) and secondly, practicing architecture. Luca is today Associate Professor in "Climate and built forms" and head of the MSc program in Sustainable Architecture at NTNU. His main interest and research focus is the analysis and understanding of climate and its implementation into the architectural design of buildings able to passively address their environmental performance towards comfort. Climate and morphological parametric analyses have been, in different research projects, addressed in design guidelines for both the design of new buildings and the energy retrofitting of existing ones. In 2009, Luca was initiator of the NTNU proposal for the Solar Decathlon 2012 and later, architect of the LivingLAB and Test Cell projects at the Zero Emission Buildings research center at NTNU.

Alessandra Bonazza
Institute of Atmospheric Sciences and Climate, National Research Council, Italy.
Mail: a.bonazza@isac.cnr.it
Simona Calvagna
Department of Civil Engineering and Architecture, University of Catania, Italy.
Mail: simona.calvagna@unict.it
Rosa Caponetto
Department of Civil Engineering and Architecture, University of Catania, Italy. Mail: rosa.caponetto@darc.unict.it
Antonio Gagliano
Department of Electric Electronic and Computer Engineering, University of Catania, Italy.
Mail: antonio.gagliano@unict.it
Mihaela Hărmănescu
Urban Plannig Faculty, Ion Mincu University of Architecture and Urbanism, Romania.
Mail: mihaela.harmanescu@gmail.com
Elena Cristina Mândrescu
Department of Architecture, Ion Mincu University of Architecture and Urbanism, Romania.
Mail: cristinamandrescu@yahoo.com
Michele Mangiameli
Department of Civil Engineering and Architecture, University of Catania, Italy.
Mail: michele.mangiameli@unict.it
Giuseppe Mussumeci
Department of Civil Engineering and Architecture, University of Catania, Italy.
Mail: giuseppe.mussumeci@unict.it
Gianluca Rodonò
Department of Civil Engineering and Architecture, University of Catania, Italy.
Mail: gianluca.rodono@unict.it
Alessandro Sardella
Institute of Atmospheric Sciences and Climate, National Research Council, Italy.
Mail: a.sardella@isac.cnr.it
Markus Schwai
Department of Architecture and Planning, Norwegian University of Science and Technology, Norway.
Mail: markus.schwai@ntnu.no



978-3-03943-711-5 (PDF)

MDPI

VVITA