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Mariateresa Galizia
Associated professor in the SSD Icar/17 at the DICAR - University of Catania. She has participated in research of international and national interest on knowledge, communication and valorization of BB.CC.AA. Since 2016 she has been the Scientific Director of MuRa, which is part of the Museum System of the University of Catania.

Graziana D'Agostino
PhD in Urban and Environmental Recovery and Design since 2013 at the DICAR - University of Catania. Specialized in the survey and digital modeling of architectural and archaeological heritage, she works on the development and restitution of 3D models for representation, documentation, geometric-constructive research.

Raissa Garozzo
PhD candidate and Building Engineer. MSc in Building and Architectural Engineering. PhD student in "Evaluation and mitigation of urban and land risks" at the DICAR - University of Catania. Since 2018 she is a tutor in Drawing and Graphical Representation courses. She is closely involved in the activities of the Museum of Representation.

Federico Mario La Russa
PhD student and graduate in Architecture and Building Engineering. Since 2019 he is a PhD student in "Evaluation and mitigation of urban and land risks" at the DICAR - University of Catania. He has been a tutor in Drawing and Graphical Representation courses since 2018. He has participated in MuRa initiatives and projects.

Novel cultural experiences for the communication of museum collections: the Francesco Fichera projects fund at Museo della Rappresentazione in Catania

The paper illustrates the strategies set up for the communication of the documentary heritage of the Museum of Representation (Mu.Ra.), Department of Civil Engineering and Architecture, University of Catania. MuRa. houses and exhibits the collections of architectural projects (Francesco Fichera Archive) and chalcographies (including the collection of G.B. Piranesi). The mission of the museum is to preserve, protect and make available to the scientific as well as to a wider community, the results of the Department research, education and dissemination activities.
This has inspired a new way of thinking, valuing and using the heritage possessed. Focusing on the enhancement of the collections and merging research and educational purposes, an innovative participatory approach has been investigated and experimented.
Indeed the students of the drawing courses and interns at the museum have been involved in their dual role of future designers and potential visitors of the museum developing strategies for new target users. Specifically, the experimentation was carried out on the projects by Francesco Fichera and was focused on the development of a communication strategy addressed to the reading and understanding of the architectural project. The aim was to actively involve the visitor in the learning process, making the visit a cognitive and emotional experience through new forms of representation. To achieve this goal the students worked both on architectures existing in Catania and on the unrealized projects, with the aim of recreating, using 3D modeling, virtual environments and reality, the visual and perceptive sensations of the unfinished architectural space.

Gaetano Seminara
Graduating in construction engineering architecture at the University of Catania. He is expert in 3D modelling and Virtual Reality. He has participated as intern in MuRa initiatives and projects.

Cettina Santagati
PhD and Assistant Professor at DICAR – University of Catania. She is head of the Laboratory of Digital Surveying, Representation and Reconstruction at Museum of Representation, University of Catania. Her research interest are focused on: 3D acquisition and modelling, HBIM, Virtual Museums.

Keywords:
Digital Cultural Experience; Architectural Heritage; Digital Survey; Museum Collections; Participation

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1. INTRODUCTION

Since the end of the 1960s, the awareness that the preservation of memory must be reconstructed through documents has become increasingly tangible. Especially in the field of architecture, this new interest in historical documentation has led to the creation of museums, centres and foundations aimed at the conservation, study, knowledge and promotion of architectural archives. This way, the dispersion of the most precious and sought-after pieces on the market would be avoided. The typology of the contents, highly technical (plans, sections), entails the need to provide the clearest and most immediate reading of the drawings exhibited.
The paper illustrates the strategies set up for the communication of the documentary heritage of the Museum of Representation (MuRa) belonging to the Department of Civil Engineering and Architecture, University of Catania. Mu.Ra. houses and exhibits the collections of architectural projects (Francesco Fichera Archive) and chalcographies (including the collection of G.B. Piranesi). MuRa is active part of SiMuA [1]. Its mission is to preserve, protect and make available to the scientific community as well as to the territory, the results of the Department research, education and dissemination activities.
The chance for many professors of the Department to manage a 'paper heritage', in which the signs masterfully tell the architecture, becomes the opportunity to coordinate research and educational programs (degree thesis, PhD, internships, courses) aimed at experimenting with new forms of communication, innovative technologies at the service of the historical heritage. In this way, with the support of the laboratories [2] present in the museum, research, didactics and the third mission are brought together, pursuing the common objective of building a museum that is a place of scientific knowledge, conservation and enhancement of history, a center of mediation between science and the public. The academic activity of the students becomes an experimental environment for new ideas of communicative/participatory forms that can embrace the cultural needs of the younger age groups. It fosters new ways to make the visit more dynamic, stimulating, interactive and open to a diversified target of users.
The participatory approach adopted does not exclude the centrality of the collection but, on the contrary, starts from the collection and from the tangible and intangible identity values of the museum itself. The collection represents the driving force behind the development of individual and collective themes and paths of meaning. Through the participation in the production of scientific knowledge - i.e. co-design and co-production of exhibition and teaching activities, communication and mediation devices - the MuRa is a cultural institution in which visitors/students can create, share and connect with each other around the contents. This way, the pyramid of management and promotion of cultural heritage is overturned, establishing the individual and collective right "to benefit from cultural heritage and to contribute to its enrichment" as underlined by articles 4 and 5 of the Faro convention on the value of cultural heritage for society. According to this vision, the community, is invited to participate with its own ideas and creative expressions, making extensive use of the tools of the new digital culture and social media for the study, preservation and presentation of cultural heritage.
In conclusion, the mission of the museum encompasses the socialization/co-production/sharing of heritage in terms of engagement, lifelong learning, edutainment, lowering socio-cultural barriers. This leitmotif embeds all the museum's activities: from research to didactics, exhibitions, workshops and projects with high schools, making ever greater use of innovative languages for the communication of cultural heritage.

Fig. 1 - On the left: a view of villa Zingali Tetto, headquarter of the MuRa. On the right, the winter garden designed by Salvatore Gregorietti.

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2. STATE OF THE ART

2.1. THE VALORISATION OF ARCHITECTURE ARCHIVES

The new interest in documents related to the production of architecture began at the end of the 1970s with the launch of the first systematic collections, either thematic or dedicated to a single author. In 1979 the CCA - Canadian Center for Architecture in Montreal and the DAM - Deutsches Architektur Museum in Frankfurt were founded. In Italy, the Accademia Nazionale di San Luca started a contemporary architecture section in 1978, while in the late 1980s the Archivio Progetti of the IUAV University of Venice and the Archivio del '900 of Mart (Museo d'arte moderna e contemporanea di Rovereto) were founded. Besides these, private centers and foundations were created, such as the Giuseppe Terragni Study Centre in Como and the Giovanni Michelucci Foundation in Fiesole, dedicated to enhancing and preserving the work of a single architect. In 2002, following the strengthening of the movement for architectural archives and after a wide-ranging debate in which the AAA/Italy (Associazione Archivi di Architettura) is also involved, MAXXI, (National Museum of XXI Century Arts), was inaugurated with a sector dedicated to twentieth-century architecture and a relative program for the collection, conservation and dissemination of archives (Guccione, 2009). In the last few years the Information and Communication Technologies (ICT) in the context of architectural archives become essential tools not only for the digitization and preservation of document assets, but also to make them available and accessible to a large number of users, in an inclusive and interactive way. A multidisciplinary approach for the fruition of architecture and urban contexts never realized is introduced in (Accardi, Chiarenza, Inglisa, & Scarpato, 2016): starting from a Digital Museum Ontology as a complex semantic resource capable of accommodating a wide variety of documents, a virtual museum is created. In (Conte & Rossi, 2019) the use of Bim-oriented software and the related virtual models were used as a document archiving system to enhance the cultural heritage left by Adriano Olivetti and his company. In (Palestini, 2019) the analysis concerns unrealized project drawn up in 1960s. Digital representation technologies provide a contribution to communicate and make the original materials (graphs, products on gloss and paper, elaborated canons, plans, elevations and sections in 1:100 scale project) more usable. This could be helpful to understand and display in an alternative way the spatiality and the contents hidden in the many hypotheses left on the drawing sheets.

2.2 PARTICIPATORY MUSEUM

The will of museums to reconnect with the people has meant that, in the context of the digital revolution, they have invited users to participate in the design of museum activities. The 'visitor' moves from a 'passive' consumer to a 'cultural' collaborator who supports the development of shared knowledge (Simon, 2010). The adoption of participatory strategies becomes fundamental to allow collaboration between the various experts and provides an opportunity to improve the visitor's community. An interesting approach to museum design involving multidisciplinary teams is the practice of Design Thinking, described in (Mason, 2018). The process consists of 5 phases during which the dialogue takes place mostly through visual tools. Data collection and feedback are used to define the problem and move on to design. The solution, prototyped and tested, is developed through collaborative processes.
These approaches may also be of interest to the territory, as in the case of the MArTA initiative in Taranto. A large-scale participatory activity has been carried out with the aim of creating a community map that ranges from the archaeological landscape to the industrial one. The museum involved teachers and students of the high schools of the area (Degl'Innocenti & Consonni, 2018).
University museum systems also introduce participatory strategies into their practices. In SIMUS (Sistema Museale Universitario Senese), in addition to the study and preservation of the collections, activities are carried out linked to the laboratories of the degree courses, actively involving

Fig. 2 - Photo taken during the researchers's night.

the students in the improvement of the museum offer (Giudilli, 2018). At the MuRa of the University of Catania (Santagati, C., Galizia, M., Basso, A., & La Russa, F. M., 2018), in parallel with the valorisation of the collections, research and teaching activities are carried out with the active involvement of the students. An example of this activity is the participatory planning of the installation of the section "Digital technologies for the documentation and communication of cultural heritage" by the museum's trainees.
Another example is the 'Whale-HUB' project, dedicated to the Whale Room at the Natural History Museum of the University of Florence (D'Ambrosio & Dominici, 2019). Groups of university students were involved in the design of the museum experience and its communication. They then took part in a contest creating a multimedia prototype of communication of the Whale Room. The main themes of the initiative are audience engagement and the evolution of the museum space from an exhibition space to a cultural hub.
Finally, an emblematic example that highlights the effectiveness of the digital medium as a facilitator in the creation of the so-called 'heritage communities' (in accordance with the Faro Convention) is the participatory project #iziTRAVEL-Sicilia (Bonacini, 2018) that collects the contributions of thousands of users who voluntarily led to the creation of more than 160 audio guides related to sites of interest on the Sicilian territory.

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3. THE PROJECT CONTEXT: THE MUSEO DELLA RAPPRESENTAZIONE AT VILLA ZINGALI TETTO AND ITS ARCHIVES

MuRa was established within the Catania-Lecce Project, which dates back to 1996 and for which Prof. Piera Busacca was responsible. The project had as its primary objective the implementation of interventions aimed at the recovery, protection and enjoyment of its cultural heritage, tangible and intangible, through the use of advanced technologies, databases and the construction of museum facilities. Specifically, the project involved the restoration of Villa Zingali Tetto [4], an historical building designed by architect Paolo Lanzerotti and built in 1930, with the aim to establish there the seat of Museo e Laboratorio della Rappresentazione (Fig. 1). The purpose was to place in a single site the archives and collections of architectural and/or graphic hold by the Department of Architecture and Urban Planning (now Department of Civil Engineering and Architecture), their preservation and use for teaching and research.
The project provided for the collections reorganization and archiving, in order to make them as accessible and consultable both online and in situ. The users are not only scholars but also the wide public and students motivated to know the history of urban identity, the stylistic and architectural roots of the environment lived.
The historical archive of DAU library hosted the projects of Francesco Fichera, etchings by Giovan Battista and Francesco Piranesi and other authors. The projects archive of architect Francesco Fichera [3], an important point of reference for the study of Sicilian culture in the crucial phase of transition to the new assets and new morphologies of the contemporary city, have been donated by the heir in 1976. The archive is composed by 1600 original drawings (made with various techniques, pencil, pastel, ink, watercolor) or heliographic copy drawings.
As regards the Piranesi's collection, is made up of 1048 tables of etchings and 187 text tables, from the Royal Calcography of Rome. This heritage is to be related to with the activity carried out by

Fig. 3 - Palazzina Enel: view of the point cloud (on the left), main façade elevation (on the right) (2D restitution by Ardito G., Avanzato S., Balba A., Buscemi G., Cosentino S., Frazzetto L., Paganello F., Puccia D., Rapisarda D.)

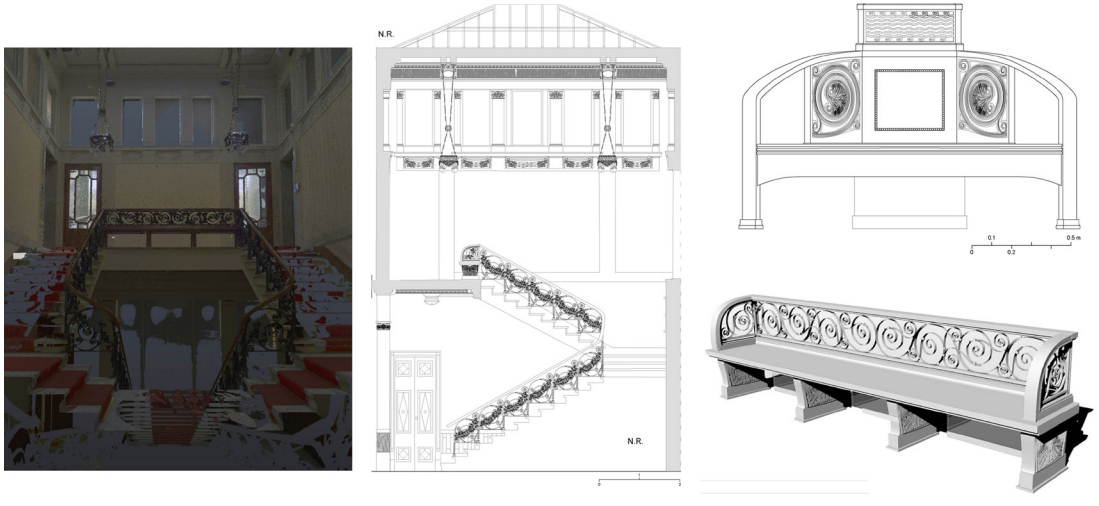

Fig. 4 - Palazzina Enel: view of the monumental staircase point cloud (on the left), cross section of the monumental staircase (center), detail of the bench (on the right) (2D restitution and 3D model by Ardito G., Avanzato S., Balba A., Buscemi G., Cosentino S., Frazzetto L., Paganello F., Puccia D., Rapisarda D.)

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Carlo Alberto Petrucci, Director of Chalcography from 1933 to 1960, who, before the war, continued the traditional activity of the Institute of donations to Public bodies distributing numerous prints to furnish the state's peripheral offices. The collection destined for Catania, sent just to Francesco Fichera, then director of the Institute of Ornate and Architecture of the University of Catania, was largely held back by the same Institute.

4. METHODOLOGY

The methodology adopted has included the participatory strategies experimentation aimed at the communication and the narration, also immersive, of the projects archive of Francesco Fichera in order to actively involve the students of the drawing courses, as well as the trainees of MuRa.
Specifically, students and trainees have worked on the architectures built in the early twentieth century in Catania and on the projects not realized. The first approach involved, in both cases, the reading and critical analysis of the project drawings hold in the archive to understand any variations in progress for the built architectures and to investigate the spatiality and geometry of the architectural project through the critical re-reading and graphic analysis of the documents for a three-dimensional reconstruction.
The next phase has involved a cognitive approach through the survey of the architectures realized by applying the fundamental principles of direct and indirect survey methodologies. The direct method included the representation of the architecture through eidotypes and then the graphic and technical documentation of the elements characterizing the layout of the facade and the planimetric system. In order to obtain a greater accuracy in the restitution of some significant elements of the chosen buildings, the instrumental and photogrammetric survey was carried out using the 3D laser scanning and the SfM (Structure from Motion) techniques. It should be noted that the survey methodology was more accessible thanks to the use of a smartphone, a technology mostly used young people. The interpretation of data acquired in situ was fundamental to obtain an accurate two-dimensional graphic restitution containing the traditional drawing graphs, such as plans, elevations, sections at different scales and the digital reconstruction through the mathematical and polygonal 3D modeling of the most meaningful architectural elements.
The last phase has deepened the relation between the curator, the artwork and the visitor. This was done to introduce new paradigms of interaction and fruition. In this perspective, students and trainees, stimulated by the teachers and tutors of the course, played the dual role of visitors and curators to find innovative solutions that communicate the path of knowledge of the architectures examined. In this way, students and trainees were the protagonists of a participatory process aimed at the design of an exhibition, illustrating in a clear and engaging way the architectures of Francesco Fichera. This experience gave the opportunity for an active confrontation with the users of the museum in order to implement strategies aimed at an effective communication of the cultural contents of the museum.

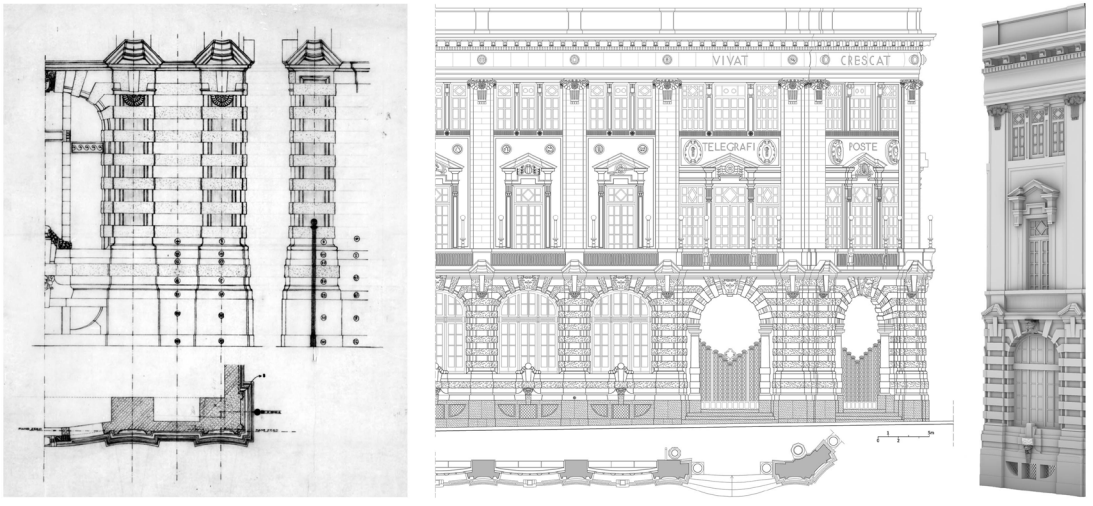

Fig. 5 - Palazzo delle Poste: project drawing of the corner detail (on the left), main façade elevation and 3D model of a façade span (on the right) (2D restitution and 3D model by Biondi R., Cucuzza D., Cutrufo R., Lauria L., Musumarra S., Quaceci N., Ruggieri F., Saitta C., Zammataro C.)

The students designed exhibition panels for each architecture analysed and selected the contents that most characterise the existing buildings, both in terms of 2D documentation and 3D digital reconstructions. Then, the prototype of the designed exhibition was "opened to the city" on the occasion of the researchers's night (sharper night) (Fig. 2), during which there was a dialogue between the students and the visitors of the MuRa where the first ones illustrated to the second the architecture they analysed. At the same time, the students collected feedback about the interest aroused and the effectiveness of the representations used. The results of these evaluations constituted new inputs for the development of new strategies using digital technologies. These played a fundamental role in this phase, because through a reasoned use of these technologies it has been possible to generate new languages and experiments to tell the public about the work of art, introducing new exhibition archetypes.
In the case of unbuilt architectures, we chose the tool of 3D modelling and virtual space to

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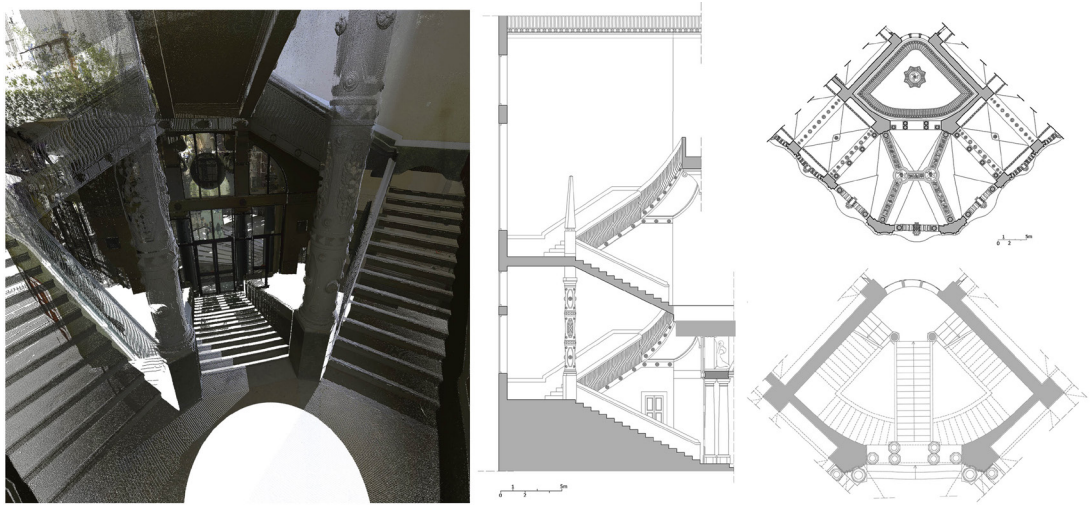

Fig. 6 - Palazzo delle Poste: view of the monumental staircase point cloud (on the left), cross section and plan of the monumental staircase (on the right) (2D restitution by Biondi R., Cucuzza D., Cutrufo R., Lauria L., Musumarra S., Quaceci N., Ruggieri F., Saitta C., Zammataro C.)

experience the spaces created by the designer through an immersive experience in Virtual Reality that allows you to move and explore interactively the imagined space.

5. CASE STUDIES

The buildings to be studied belong to the Francesco Fichera's archive fund. They were chosen on the basis of various criteria such as the students' knowledge of them, the architectures in which the community is most identified and the presence of graphic documentation contained in the MuRa archives. In particular, four architectures have been chosen: Palazzina Enel (1913), Palazzo delle Poste (1919), Garage Musmeci (1924) and Casa sul Mare (1933) (Galizia, 2002) (Guarrera, 2017).
The Palazzina Enel and the Palazzo delle Poste are two examples of public architecture designed by Fichera for the city of Catania. Garage Musmeci, also present in the historical centre of Catania, has a mixed use, both commercial and residential. On the contrary, Casa sul Mare was designed for a private client and never built.

5.1. PALAZZINA DELLA SOCIETÀ ELETTRICA

Designed in the early twentieth century, the Palazzina (Figg. 3-4) for the supply of electricity is located in the 1800s urban expansion area, in the East of Catania. The linear and compact building is characterized by a distribution system based on classical criteria of regularity and symmetry. The project, inspired by the North European culture of the Vienna Secession, builds soberly and innovatively the decorative theme of Art Déco. The building consists of three levels. Generators and counters for the sorting of electricity were located in the basement, while the ground floor was dedicated to customer support. On the first floor, finally, there were the offices of the managers. The entrance hall, placed orthogonally to the street front, leads to the large central hall, naturally illuminated by a functional skylight with a wrought iron frame. Symmetrically in line with the building is also the monumental "pincer" staircase, decorated with a rich cast iron railing with spirals and Art Nouveau motifs. The main façade is divided into three sections, the largest of which is subdivided into three bays. The surface is rhythmed by: slightly projecting pilasters and stringcourses, decorative terracotta tiles with the symbol of Trinacria on a base of light plaster, architraves of the opening rooms of the first floor treated with a colored strigilature, rough plaster with ashlars that marks in horizontal bands the wall face on the ground floor. The symbol of the ear of wheat, allegory of fertility and of the passage from shade to light, is recurrent. The building has undergone several changes over time, mainly due to the change of use: the entrance and the large hall are now a commercial area, while the rest of the building is private. To separate these areas, a room divider that hides the monumental staircase, the true fulcrum of the entire building, has been created. Because of this, it is impossible to have a clear overview of this piece of architecture. The combined use of direct, photogrammetric and instrumental [5] surveys allowed to document the accessible but not fully enjoyable spaces of the building, to bring back them digitally to the society. In particular, several scans were carried out between the secondary entrance, the monumental staircase, and the external area up with the skylight. The laser scanning survey was chosen also for the façades, to relate the inner spaces, not visitable, to the outside the building. Instead, the photogrammetry was used to survey some furnishings from the epoch, i.e. two wooden benches placed in the hall and in the upper gallery. Starting from this information, digital models have been created.

5.2. PALAZZO DELLE POSTE

Palazzo delle Poste (Figg. 5-6) is located in a site that occupies an entire lot facing via Etnea, via della Posta and via Sant'Euplio. The building, designed around 1919 and built in 1929, is on three levels and is marked by convex walls. The main entrances are located at the corners, an atypical solution but studied in relation to the presence of the Giardino Bellini in front. The lava stone and the Ispica stone are used for the elevations and dialogue with the rest of the architecture on Via Etnea. Despite the baroque language of the exteriors, the building is characterized by innovative solutions in the definition of paths. The distribu-

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tion scheme provides two galleries that develop around a courtyard forming a 'C'. The external gallery houses the desks for the public, while the internal one is used for the sorting offices. In line with the main entrance there is the staircase for the public, which is interesting for its triangular plan and the unusual development of the ramps. The staircase has elements already present in the envelope but also unique artifacts such as the two columns supporting the intermediate landings decorated with geometric and floral elements in Art Nouveau style. It is currently not accessible to the public because it does not match current safety standards relating to the minimum height of the parapets of the stairs of public buildings.
In agreement with the students, it was decided to return to the community the vision of this environment, unknown to most but inside an architecture daily attended by citizens with which the City relates daily. While the survey of the elevations and galleries on the ground floor was being conducted, a series of laser scans were carried out in the staircase using the RTC360 laser scanner. The point cloud obtained was interpreted by the students that returned a section along the axis corresponding to the access ramp so as to highlight the vertical development. A hyposcopic plan was also created to focus the attention on details such as the anchoring of the lamp and the connection between walls and ceiling. Photogrammetric surveys (SFM) were conducted, which allowed the acquisition of various decorative elements belonging to the allegorical language used throughout the building. The geometric genesis and meaning of these ones were subsequently investigated.
In order to represent the plasticity of the external envelope, a NURBS model of the external wall of the facade was created. The sculptural elements, typical of the area (such as mascheroni) as well as the ones belonging to a classic language (festoons and capitals) were surveyed with photogrammetric techniques and then inserted as textured mesh into the model.
The results collected during the sharper night showed a strong interest in the main staircase, especially the fact that this environment is not open to visitors. Together with the students, an effective and attractive way of using the surveyed material was designed to encourage even the youngest to discover this hidden environment.

Fig. 7 - Garage Musmeci: project drawing of the cross section (on the left), orthophoto of main façade by poligonal model (on the right) (poligonal model by Ferrara E., Fichera A., Paladina G., Perrone V.)

5.3. GARAGE MUSMECI

Garage Musmeci (Fig. 7-8) was designed by Fichera during the industrial and business development period in Catania, in particular the automotive one. It represents an expression of Art Déco interpreted in local terms. The baron Musmeci, who commissioned the work, requested the construction of a building with a dual use: on the ground floor large rooms for the cars exhibition and sale, on the first floor his own home. The architect had to design the building in a corner lot, the crossing Via Conte di Torino and Piazza Bovio; this allowed him to express and show his great design ability. The corner solution designed by Fichera eliminates the edge that would have been created between the two external elevations by interposing a cylindrical connecting volume. This solution creates a pleasant, continuous and harmonious movement of the facade. On the ground floor, the entrance hall placed in the corner separates the rooms used for garages and offices (facing via Conte di Torino) from the expositions area (overlooking Piazza Bovio). Instead, on the first floor, the cylindrical volume contains the representative hall of the baron's private house. On the top floor, the cylinder ends in a small circular terrace protected by a wrought-iron parapet with two lightning rods on the sides, recreated in architectural language, crowned by a baroque decoration. The two facades have large showcases framed by a rhythmic pattern marked by pillars, a reference to classical architecture. The white stone pillars, above an imposing lavic basement, are in fact connected to the string-course frame by means of a wheel-shaped decoration supported by wings. This decoration, which symbolizes speed, seems to represent the pivot around which the movement of a piston takes place, symbolized by the pillar itself. The strong symbolic reference to the au-

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tomotive industry is clear. A similar language is used for the decorations of the balcony doors on the first floor which are attached to the crowning cornice, creating the effect of the so-called "hanging sheets". In the crowning cornice, in line with the pillars below and with baskets of flowers above, Fichera inserts the jellyfish heads whose hair are fluent decorative ornament.
The elevations of Garage Musmeci have been surveyed using the SFM technique. This choice is due to the two external facades, strongly characterized by elements of high figurative value, so the aim was precisely to obtain a polygonal model able to convey the important symbolic value of the building. From this, through the process of Reverse Modeling, it has been possible to obtain the solid model of the pillar detail. This architectural element has aroused a strong interest from visitors, who started to suppose possible reasons on the symbolism clearly expressed by the designer.

5.4. THE STORYTELLING OF AN "ABSENT" ARCHITECTURE: THE PROJECT FOR THE CASA SUL MARE

The project for Casa sul Mare (Fig. 9) was conceived by Fichera in 1933. As often happens in professional practice, this house by the sea was a drawn but never built architecture. It represents an expression of the designer's poetics, uncontaminated by the compromises linked to the construction phase (Garofalo, 2014). The interpretation and graphic analysis of this architecture is a real hermeneutic act that reveals the process of ideation and composition through a critical reading of the graphic sign.
The house is designed for a private client on an included site facing the sea. Although it has not been possible to identify the design context, the analysis of the available project documents suggests that it could be the jagged lava cliff that characterizes the coast of Catania, most known as the area of "via dei villini a mare". This was deduced from the arrangement of the external areas, clearly visible in the axonometry. From a compositional point of view, the square is both the planimetric and volumetric design module. This architecture is

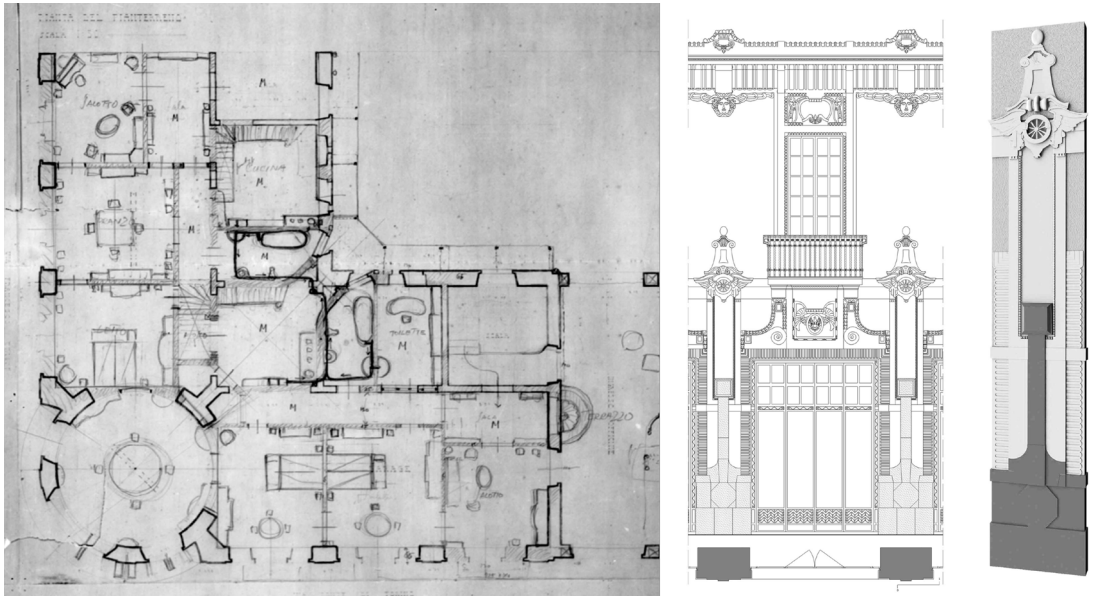

Fig. 8 - Garage Musmeci: project drawing of the plan (on the top), detail of the façade (on the left) 3D model of the parasta (on the right). (2D restitution and 3D model by Ferrara E., Fichera A., Paladina G., Perrone V.)

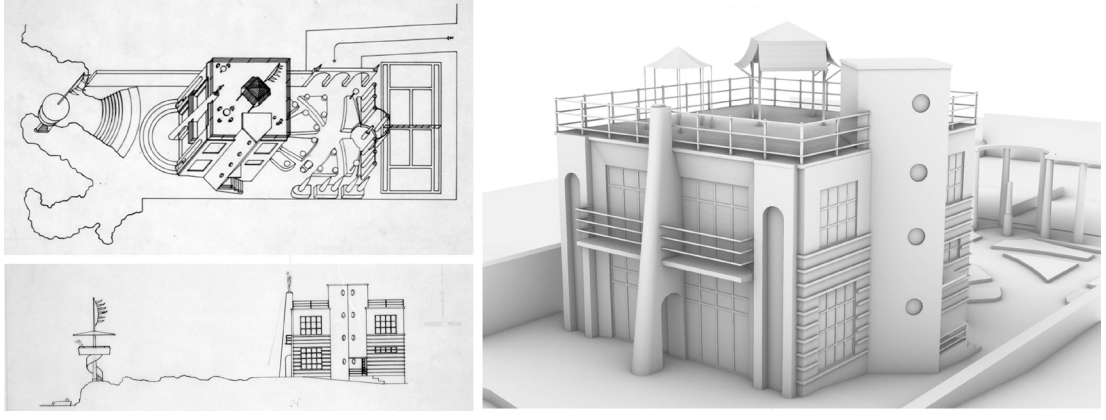

Fig. 9 - La mia casa sul mare: (from top to bottom) project drawing of the elevation and axonometric drawing, views of the reconstructed 3D model (3D model by Seminara G.)

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a compact volume broken by 45°-rotated square stairs volume. The theme of the sea is recurrent throughout the project, starting from the bands that mark the elevations to the porthole shape windows, the decorative elements (fish, triton) and to the large windows overlooking the sea. In this phase, digital representation has assumed a pivotal role, becoming the virtual place where the project has taken shape and the place of simulation, in which to verify the congruence of the spatial articulation and the perceptive control of those spaces. After a first phase of study, that led to a comparative graphic analysis between two different design solutions, we proceeded to model the building and the context.

As the "construction" of the digital model proceeded, emerged: the volumetric and full/empty ratios, the plano-altimetric development, the relations between lights and shadows, the link with the surrounding context. But the architecture is also made of materials; in the absence of indications on the drawings, we proceeded by analogy with dwellings of the same type to hypothesize the possible finishes and relative colours/patterns.

From the digital model it was possible to extrapolate all those representations that allowed us to tell, through new representations and points of view, the project. However, with the aim of implementing a strategy for the best use and enhancement of the Fichera project fund, it was decided to make Casa sul Mare accessible to visitors through the design of an immersive experience in virtual reality (Fig. 10). The objective is to guide the visitor inside the model to allow an interactive exploration and to experience perceptually the spatiality of internal and external spaces designed by Fichera. In the perspective of a participatory design of the prototype of virtual experience, an evaluation questionnaire was prepared, given to visitors from time to time, in order to identify strengths and weaknesses according to the type of user. The results of the evaluations were used to "refine" the prototype.

Fig. 10 - La mia casa sul mare: virtual project (3D model by Seminara G.)

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6. CONCLUSIONS AND FUTURE DEVELOPMENT

The results of the visitors' feedback have been the starting point to ideate communication strategies that, through the use of the digital medium, would allow an improvement of the contents of the exhibition for the divulgation of the contents of the MuRa. In the perspective of making the most significant parts of the study buildings digitally accessible, it was decided to use web platforms such as Sketchfab. In the latter, it is possible to explore the model (point cloud and/or mesh) from your smartphone or activate virtual reality through low-cost viewers allowing an immersive experience. The interaction by the visitor passes through the use of QRcodes. These are positioned in the same drawings realized by the students and scanning them using a smartphone it is possible to access the web position of the models inside Sketchfab.
The experience conducted at MuRa has shown how through a participatory approach it is possible to design new cultural experiences and create the basis for a community heritage that, according to the Faro convention, fosters a sense of belonging to places and a sense of collective responsibility in taking care of cultural heritage. The museum thus becomes a socio-cultural hub, a place of exchange of knowledge and continuous cultural and professional training for the territory.

NOTE

The surveys were conducted in the course of Architectural Drawing 2, academic year 2018-2019, teacher Mariateresa Galizia, tutor Graziana D'Agostino, Raissa Garozzo, Federico Mario La Russa.
The modeling of the Casa sul Mare is the result of the internship activities of Gaetano Seminara at the Digital Representation laboratory of MuRa for which Cettina Santagati is responsible.
The research activity carried out by the authors in full sharing of the objectives, methodologies and results of the investigations, sees the editorial responsibility of this essay as follows: paragraph 1 and 6 to Mariateresa Galizia,; paragraphs 2.1 and 5.1 to Raissa Garozzo; paragraphs 2.2 and 5.2 Federico Mario La Russa; paragraph 3 Cettina Santagati; paragraph 4 Graziana D'Agostino and Cettina Santagati; paragraph 5.3 Graziana D'Agostino; paragraph 5.4 Cettina Santagati and Gaetano Seminara.

[1] Italy has been a pioneer in the "third mission" of universities, formally recognising in 2010 the role of museums, collections and heritage in assessing the quality of research. With this in mind, in 2015 the University of Catania established the SiMuA (University Museum System) which is structured in an integrated system of 22 museums and collections in which to find the heritage and knowledge of the main sectors in which the departments operate.

[2] The Museum of Representation has as its objective the strengthening of the didactic and research activities of DiCAr. Two laboratories have been set up to support these aims : R3D_LAB (Laboratory of Surveying, Representation and Digital Reconstruction) and Spra (Tools for the Project of Architecture).

[3] Francesco Fichera (Catania, 1881-1950) is one of the main protagonists of the Sicilian architectural culture of the first half of the twentieth century. Since 1913 he has held the chair of "Ornamental Design and Elementary Architecture", at the first nucleus of the future Faculty of Engineering of the University of Catania. He is considered as one of the greatest protagonists of sicilian Modernisms.

[4] The building has been inherited by University of Catania in 1972, after the death of lawyer Paolo Zingali Tetto.

[5] The instrumental survey was carried out using the RTC360 laser scanner

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