

Design Drawing

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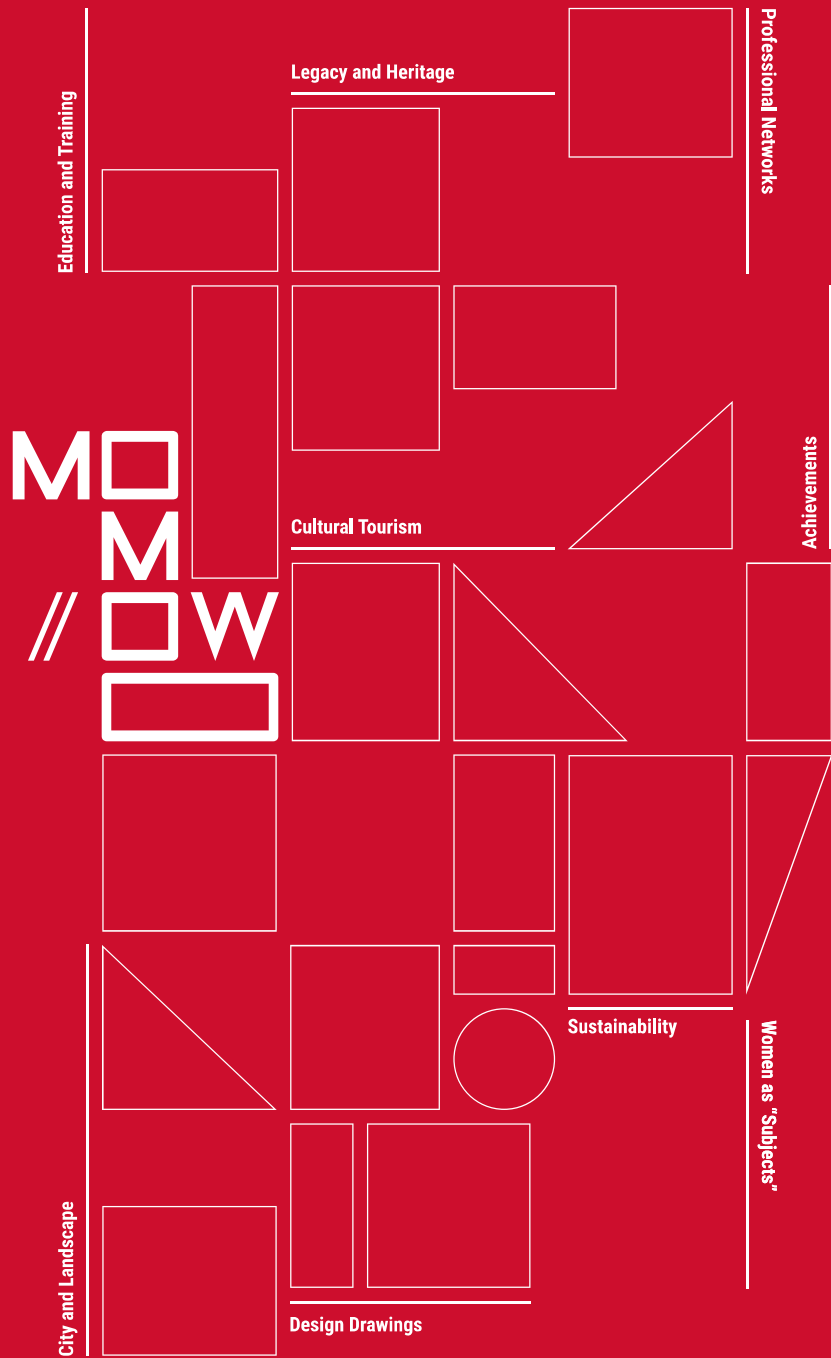
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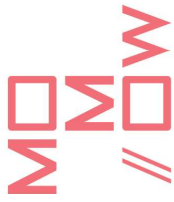


Women's Creativity since the Modern Movement (1918–2018)

Toward a New Perception and Reception



Creative Europe



WOMEN'S CREATIVITY SINCE
THE MODERN MOVEMENT



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Women's Creativity since the Modern Movement (1918-2018)

Toward a New Perception and Reception

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Design Drawings

Design Drawings

Modern Movement Design Drawings (MV)

In order to be able to talk about the ways in which the design Drawing was used by the protagonists of the Modern Movement, from its origins to the most advanced phases of this season, it is necessary to make some clarifications on the practice of Drawing in a general sense, to circumscribe and define some peculiar characteristics of it that allow to evaluate in a broader and more articulated way the graphic outcomes of the period under examination.

With regard to Drawing we can distinguish two different approaches: it can be understood as an instrument that describes reality in a more stable form that reality itself, even in the discretization of the information that connotes it, or as a tool to imagine reality through design, explicating cultural references, its meaning in the culture of origin, the logic of construction and concatenation of spaces, structural thought, poetics, etc.

In the design field, Drawing is not intended as a simple outcome of an ideation process or even as a work tool, which adapts itself to the purposes for which it is used depending on the fields of application: we must understand Drawing as an extension of the designer's mind, an instrument that structures the forms of thought and leads, through an iterative path, to the maturation of the design idea. The outcomes strongly depend on the type of representations used, testifying to the fact that Drawing is not a neutral tool.

Furthermore, we cannot forget the important value of Drawing as an instrument of reasoning and control of the ideation process:

The syntax that, through projective geometry, structures the language of representation relates to the geometry of architecture, becoming the vehicle of connection between two-dimensionality and three-dimensionality; in this sense, in the place of Drawing, the *ratio* goes alongside the magical power of the plastic invention. In the language of drawing geometry ... offers in the design process its logical reasons for ordering and measuring the architectural space.¹

The role played by Drawing in the process of design development can be further specified and divided into two distinct phases: the first one, in which Drawing is the intermediary of a dialogue of the designer with himself, and the second one in which designers, through the communication possibilities of Drawing, addresses their work to the various referents that in a democratic society are required to participate before the realization of architecture.

At the beginning of the twentieth century, in the architectural field, we witness the break with the nineteenth century tradition produced by the season of historical avant-gardes, in contrast with the strict control exercised by the academies. The early stages of development of the Modern Movement, which start from it, encourage a further departure from the past and from tradition: architecture, abandoning all sorts of decoration, becomes a vehicle for progress and new social commitments, in a utopian and idealistic key.

The Modern Movement, considered in its entire temporal development, is expressed in a very articulated way, to the point that we can speak of a sort of collection of movements, which produces a very wide and diversified architectural proposal, conveyed through a representation (sketches, drawings, etc.), which reflects the essence of protagonists, of their value systems, of the critical points on which they are questioned, of the materials used and of the formal appearance of the buildings.² On the one hand we witness the fascination for modernity in a technological and industrial sense, to which, on the other, we associate a refusal of the excessive decoration of academies' time and the search for clarity and cleanliness of architecture through simple and primary geometries.

Drawing becomes the founding instrument of a multifaceted spatial research. The characteristics of modern architecture -including symmetry, blocked volumes, the tendency towards simplification and order- seem to be conditioned on the one hand and translated, on the other, by a harsh drawing, which is committed to define new formal parameters: think, for example, at the drawings by Wagner, Loos and Hoffmann, from which a graphic rigor emerges tending to enhance the stereometric and purity of the volumes of a simple and lasting architecture.

In order to frame the graphic production of the architects of the Modern Movement it is very interesting to consider the aspects related to the formation and transformation of the profession of architect. The architects of this period are educated for the most part in technical schools and institutes for Arts and Craft, such as the Bauhaus. Most of young architects dedicated themselves to visiting famous sites to learn from the observation and sketch of historical monuments and contemporary architecture, reworking their characteristic traits in a personal way.

Many of young architects found employment at the 'Greats', such as Le Corbusier and Walter Gropius, make use of this experience to develop their own personal style. 'This cross-fertilization created some interesting ancestry through offices and lineage of influence. This was part of the internationalization of the international style ... and part of its fallacy'.³

Starting from a common base and sharing of ideals, the young people of the Modern Movement developed their own style according to their attitudes, local building techniques and regional traditions.

The identification between building and designer transforms architecture into an object of personal ideology. The leading figures in the international architectural scene dictate headlines that reflect their talent and their efforts. This also brought about a change in the organization of the architectural offices 'since they required a larger number of drafts-people. Many factors were affected, including who controlled design, the methods of presentation for commissions and competitions, and how drawing were used for publicity'.⁴

This reconfiguration of the design teams, implemented by a high number of professionals related to the fields of structures, territorial planning, etc. contributed to a profound change in the role of architects in the design and construction process, with a considerable impact on the quantity of drawings, sketches, etc. The architect, in fact, loses the control of architecture in its entirety, having to confront many projects at the same time and with many other professionals: Drawing becomes, in this way, the main means of communication between the professionals involved and a document that establish the division of responsibility linked to the different phases of construction. The era in which the architect completely controlled the construction process ended, where only a few drawings and a close relationship with the workers were needed to effectively control the entire construction process. Consequently, the drawings needed to be more thoroughly explanatory, leaving nothing to chance, to ensure that the building was constructed as it was conceived.

What previously could be defined in the construction phase now has to find a solution in a previous moment: the architect must therefore make an unprecedented effort of imagination to anticipate

3 Kendra Schank Smith, *Architects' Drawings: A Selection of Sketches by World Famous Architects Through History* (Oxford: Elsevier, 2005), 164.

4 Schank Smith, *Architects' Drawings*, 165.

1 Roberto de Rubertis, *Il disegno dell'architettura* (Roma: La Nuova Italia Scientifica, 1994), 159.

2 Luigi Vagnetti, *L'architettura nella storia di Occidente* (Padova: Cedam, 1979).

the three-dimensional construction through the drawings. The concept of the project takes place entirely in the abstract, before its constructed manifestation: sketches and drawings are a means to explore the construction of its whole, from the geometric shapes involved to the solution of details, to the choice of materials and to the calculation of the structural system.

Since the architects of the Modern Movement were very conscious of the revolutionary nature of their theories and their work 'they composed manifestos heralding a 'new' architecture, and with this change in attitudes, philosophies about the design process also changed'.⁵ In contrast to a tradition that was interpreted through a new idealism, the 'famous' architects of the Modern Movement were also conscious of having to confront the inheritance they left behind: in this sense drawings and sketches take on a new role and are produced and stored in order to guarantee future generations to understand their philosophies and intentions.

Modern architecture, which expresses itself through the search for sincerity, order, logic and clarity,⁶ shows these objectives also in representation, which uses traditional techniques with new purposes: still using plan, section and elevation the architects of the Modern Movement also employed axonometric drawing. The plan is considered of primary importance, since it explicit proportions, relations between the parts, distribution of spaces on a free plan. The axonometry, placing the point of view at infinity and showing the object represented by an angle, constituted a measurable version of the three-dimensional representation in which the observer, removed from the architectural space, poses in an unemotional stance. Moreover, with the advent of the use of the metric system to replace units of measures referring to the human body, the Modern Movement reaffirms an abstract idea of architecture. The representation is not, as in perspective, the result of the choice of a particular point of view, but gives each side of the construction the same emphasis, objectifying the subject without focusing on the participation and involvement of the observer. The axonometry can be constructed more simply than perspective, ensuring a more rational volumetric view, because it does not distort the proportions, where it is possible to have free access to the measurements along the axes that hold up the representation. The same projective methods rule sketch representation, animated by the same communicative intentions.

Newly refined precise media and instruments are introduced in the realization of the drawings, including rapidograph pens and felt tip markers, which together with new technologies make the reproduction of the drawings possible, adding a very important innovation in the design process.

5 Ibid.

6 Nikolaus Pevsner, James Maude Richards and Dennis Sharp, *Anti-Rationalists and the Rationalists* (Oxford: Architectural Press, 2000).

Issues of Enhancement and Sharing of Archival Drawings (RS)

Contemporary architectural archives constitute more than a documentary heritage, recently recognized and validated.⁷ Since the end of the Seventies, effectively, the principal North-American and North-European institutions engaged in the knowledge and diffusion of Architecture have been working hard and more carefully into conservation and enhancement of contemporary architectural drawings, which need specific standards for their description, preservation and fruition guaranteed by international associations, like ICAM (International Confederation of Architectural Museums) and ICA (International Council on Archives).

The international archives take part to the ICA, whereas the archival cooperation in the European Union sphere is developed by a working group called European Archives Group (EAG), born in 2006.

Such a recent interest about architectural documentary heritage is carried out by different fields of research that starts from the drawings' analysis and is elaborated according to numerous disciplines: history of representation, history of architecture and city planning. Moreover, its value is justified by the same meaning taken being a proof of a phase in the design process that could be ended with the construction or remained on paper. For this reason, recently various institutions arose, engaged in the promotion and fruition of architecture in general, and particularly focused on the safeguard of the documentary heritage, made up of heterogeneous material. This trend, still of north European and North American origin, led to the foundation of museums or hybrid structures containing collections of architectural documents.

Graphic project documents could be classified as cartographic material, survey drawings, sketches, preparatory and/or demonstrative drawings, final drawing, construction drawing, detail drawing, renderings, digital videos. These types could be group as aid materials for work or as products under preparation phase: design, definition, execution, construction site, communication, maintenance, management; they could be made also for different purposes: competitions, contracts, promotions, and customers: private or public.

Issues of conservation, enhancement and sharing have to face the characteristic of the different materials used during the last century.

Restricting the reasoning to the design drawing it must observe that since the twentieth century, the traditional paper supports have been juxtaposed by other types of support, including acetates and derivatives from plastics.

Since the twentieth century, the material traditionally used in the drafting of the architectural

7 Riccardo Domenichini and Anna Tonicello, *Il disegno di architettura: Guida alla descrizione* (Padova: Il Poligrafo, 2004).

drawings, has been juxtaposed by new supports and techniques. In addition, the same paper differs significantly in its composition depending on the era it was produced in. The same argument is valid to the tracing papers, which differ mainly with the introduction of new materials and related techniques of graphic reproduction. So, in a contemporary architectural archive there are miscellaneous supports, including: traditional paper, cardboard, tracing paper of different matrix (traditional and/or tissue paper, vegetal parchment, etc.), sheets of acetate.

Even the graphic techniques of the architectural drawing are extremely varied (pencil, charcoal, pastels, felt-tip pen, water-colour, ink of various types, etc.), sometimes of artistic origin. Another peculiar aspect of the contemporary architectural archives is the use of the reproduction techniques of the drawings, necessary for the design activities: the need to represent quickly different executive variations involved the drawings duplication using techniques that have appeared since the twentieth century, resulting from the evolution of photography and the research on light-sensitive substances. Therefore, in an architectural archive, multiple copies of the same drawing could be often group, made by means of different techniques such as the blueprint, the eotography (or aniline process), the heliography (or diazotypes) and the xerography, that lend themselves to the use of other supports than the traditional ones. The radex corresponds to this case, because it is a heliography print on a polyester sheet.⁸

An ontologically different type of worksheet has been introduced by technologies and software for architectural design diffused since the Eighties, therefore only in the last years concerned by the research promoted by MoMoWo. These innovations led to significant impact not only in the design phases, but also in the products in the matter of architectural drawings in digital formats. This phenomenon involved the formulation of other conservative and communicative strategies.

If, on the one hand, the IT revolution has produced an exceptional speed of obsolescence of hardware, storage media and drivers for reading storage devices, on the other hand, software are replaced by new releases that make it sometimes impossible to opening files created in past years. Moreover, often, not all the files saved in the original format are correctly transmitted together with their links (reference files, images, drawing templates), with indications to the expected printing scale, and to the pen thickness tables necessary for an optimal print. Saving file's formats such as the ever more established .pdf, are currently enhancing their reading tool potentialities by facilitating sampling of measurements and revisions, as well as free explorations by the user, such as three-dimensional model cut sections.

8 Roberta Spallone and Francesca Paluan, "Digital Archives for Preserving and Communicating Architectural Drawings," *Encyclopedia of Information Science and Technology*, edited by Mehdi Khosrow-Pour. (Hershey, PA: IGI Global, 2017, Fourth edition), 5213–5225.

Systems of Dissemination and Enhancement of Documentary Heritage and Specific Values of Female Archival Drawings (RS)

Architectural digital archives, as well as they provide research systems that could be queried to find the documents, are managed by methodologies useful to the safeguard and enhancement. The knowledge of the archive is the first key moment of safeguarding: for their constitution, archives are the containers of information not to be easily group without a direct survey of the institutions dedicated to the fruition. The first step to the knowledge is the catalogue consulting: this initial research, even if it is remotely conducted, usually provides the descriptive metadata of the objects.

The system of sharing archival collections by digitizing or photographic reproduction of materials and creating a database that can be queried to facilitate research is becoming increasingly widespread. This happened for the documents of the masters of the twentieth century owned by the foundations (Le Corbusier, Alvar Aalto, Frank Lloyd Wright, ...) and for the most prestigious museum collections (MoMa, Tate Modern, Accademia Nazionale di San Luca, ...). While this operation involves all or most of the materials owned, the selection for sharing on the web is generally focused on iconographic products.

The transition from the analog source to the digital product by scanning or photographs produces files with different mass-diffusion standard extensions (.pdf, .tiff, .jpeg, .png), thus promoting the dissemination of the material to a wide public.

Digitization is a subject of debate among the various institutions, so that drawing unequivocal conclusions that could be applied to the different areas of expertise is still impossible. The need to address this issue arises from the awareness that about the 80% of digital documents created in the nineties will be (or has been) lost due to the rapid technological evolution whose preservation problems have not been solved yet. The digitization of the architectural archival heritage is penalized by the high initial costs and software and hardware maintenance for data management, but it is a potential storage medium that ensures the enhancement broadening the range of public, running as security storage of information. The use of ICT is not necessarily limited to the communication: its propensity as a means of education facilitates the learning thanks to the immediacy of message delivery and the simultaneous establishment of hyperlinks.

By restricting the interest to the drawings, which are at the centre of our focus as scholars, the two processes of digitization and networking, including the selection of the metadata that accompany the drawings, entail a series of issues.

Indeed, the displaying of architectural drawings turns out to be quite unsuited to the survey and interpretation of the document, because the image files, rarely downloadable, generally has a low-resolution, preventing the reading of the graphical information. In addition to the inadequate under-

standing of the graphic message, the diffuse lack of the dimensional scale prevents the recognition of the drawing dimensions while the presence of the written measurements may be relatively useful if they are insufficiently visible. These considerations emerge during Web navigation. Digitalized drawings only sometimes could be downloaded; also in this case the resolution remains most often inadequate. Despite the innovative technologies related to the scanning offer ever more efficient performance, architectural drawings inserted in a database remain icons that could be partially zoomed in. These limits are attributable to several factors: i.e. the images are bound by strict regulations of copyright which force the user to a superficial study of the drawing, or the results of digitization realized in different times, with different technologies and standards are not homogeneous.

The exhibition of drawings from the architectural archives is another way of promotion and divulgation of such heritage. The physical exposure, however, is not always practicable especially for preservative reasons (extreme fragility of the documents, impossibility of their mobilization into other spaces). For this reason, the online virtual exhibitions fulfil effectively this purpose, allowing the physical safeguard of the drawings and the active participation of visitors in a multimedia and interactive exhibition. In this context, the technological development in telecommunications and computer graphics field has made possible innovative educational experiences in the Cultural Heritage fruition, using the Web or mobile devices to display new digital products such as animations, applications for immersive experiences, virtual and augmented realities designed to offer the users engaging experiences.

The result could be the creation of dynamic products, updatable also by the public involved in the resources exploration according to free interpretative readings. The online virtual exhibition is also developed according to thematic itineraries that are paths that allow the public an extremely independent approach in relation to the space-time location and the origin of the documents.⁹ Actually, some kits dedicated to the creation of online virtual exhibitions exploiting the open source software have been developed,¹⁰ taking advantages of the Web potentialities to make the invisible visible and available this sector of cultural heritage risking the oblivion, such as the extremely scattered architectural drawings in public and private archives.

Different attention requires the so-called minor archives that are the testimony of figures that will not enter as protagonists in the history of architecture but, especially in the twentieth century in the Western world, contributed to the transformation of the shape of cities and territory, from post-war reconstructions, to the economic boom, to the de-industrialization.

9 Schubert Foo et al., "From digital archives to virtual exhibition," *Handbook of Research on Digital Libraries: Design, Development and Impact*, edited by Yin Leng Teng et al. (Hershey, PA: IGI Global, 2009), 88–101.
10 See "5 Free and Open Source Tools for Creating Digital Exhibitions," OEDb, <http://oedb.org/librarian/5-free-and-open-source-tools-for-creating-digital-exhibitions/> (accessed June 4, 2018).

These collections are very widespread and generally stored by the descendants of the designers, with great sacrifices of resources and space, to preserve the memory of their family members. They generally consist of definitive and executive technical drawings, urban, architectural, structural, and plant design, and other iconographic documents, as base maps, surveys, cadastral maps, photographs, textual documents, correspondence with the clients, suppliers, colleagues, and project collaborators, technical documents, calculations, etc.

The minor archives of women, architect and engineer, involved in the projectual activities related to the construction of cities and buildings, acquire, in the overall project of MoMoWo, a particular importance. Studies presented in previous MoMoWo Workshops-Conferences¹¹ highlighted the value that the discovery of such Archives can assume.

Indeed, as Franchini and Garda stated 'contemporary history of women in design profession and the tangible cultural heritage or legacy produced by their works are still mostly unknown today.'¹² Moreover, while architectural profession was practiced by a fair number of women, civil engineering one was reduced to very few women, mainly operating in the second half of the twentieth century.

The stories of these women, that we can reconstruct through the archival documents, can help us to understand their role in the studies, in the firms, in the building sites; their way of working, autonomous or in group, their relationships with other professionals, ... and to highlight their real contribution to the territorial and urban transformation.

Digital archives of female architects and engineer could be established to prevent the risk of their dispersion and oblivion: the fragility of such cultural heritage depends on the low visibility except for a highly specialized field. Digitization is therefore an approach that first tries to make recognizable this hidden heritage, making it available to an increasingly connected public. Breaking down the barriers of space through navigation and remote access to the data and the temporal ones through the devices running in real time, the possibility to view documents is finally satisfied, if the documents will be equipped with the information that addresses to a more specific analysis regarding the iconographic message.

11 Roberta Spallone, "The Archives of a Professional: Maria Luisa Spineto, Civil Engineer and 'Thorough Designer,'" *MoMoWo: Women Designers, Architects and Engineers between 1969 and 1989*, edited by Ana María Fernández García, Helena Seražin, Caterina Franchini and Emilia Garda (Ljubljana: Založba ZRC, 2018), forthcoming.

12 Caterina Franchini, and Emilia Garda, "Making Women's Works Visible: The MoMoWo Project," *MoMoWo: Women Designers, Craftswomen, Architects and Engineers between 1918 and 1945*, edited by Marian Groot, Helena Seražin, Caterina Franchini and Emilia Garda (Ljubljana: Založba ZRC, 2017), 16–20. Series Women's Creativity, Vol. 1, <https://omp.zrc-sazu.si/zalozba-zrc/catalog/view/2/1/61-1> (accessed June 4, 2018).

Digital Strategies and Proposals for Enhancing and Sharing Female Drawings Heritage (MV)

Digital reconstructions of contemporary architectures which were demolished, transformed or that have never been built, is now a method of investigation of considerable heuristic value, allowing to read and preserve the memory, also by creating new images, of cultural heritages that no longer exist in their original shape or never reached a material construction.

Digital reconstructive modelling is currently the field of investigation on which the research of large numbers of scholars who address the subject through different disciplinary approaches converge, ranging from history of representation, history of architecture, and architectural composition.

Several digital reconstructions, mainly realized by Italian scholars, are inspired by theories and methodologies on graphical analysis that could be applied to archival design drawing as well to existing buildings.¹³

In particular, the research of Giuseppe Pagnano on five houses by Adolf Loos, represents the milestone of the method: graphic analysis, using digital tools, increases its possibilities of investigation on architectural criticism providing new contributions of knowledge that highlights, through the integration of historicized information, the figurative reasons of architectures' visible conformation. Through digital reconstruction it can be conferred to unrealized architecture a form of existence that make them verifiable objects in the same way as those built.¹⁴

The application of the method requires the researcher to re-construct in a virtual space the consistencies of the architecture whose digital representation connects, through a reasoned and critical comparison, the various cognitive data, returning them in a synthetic way.

The different phases of the 3D reconstruction of architectures, from the gathering and interpretation of information from the sources to the development of a geometric model on which to apply texture mapping and light for the rendering, do not constitute neutral operations towards the studied object. They are stages in a process which changes one model into another through a critical selection of the information: with an interpretative intent they aim at the creation of 'an abstract model... that we can identify in the project idea'.¹⁵

Kent Larson, remarking on his own reconstruction of six Kahn's unrealized buildings, raises some important questions related to the role of digital modelling for the reconstruction of unrealized projects. He observes that the incomplete evidence left by the architect could be the score of a performance, where personal interpretation and addition of details are permitted.¹⁶

The creation of a 3D digital model offers, as a result, infinite possibilities of observation and survey: from the objective visualization of a cylindrical projection, orthographic or isometric, to that subjective of a conical projection, perspective.¹⁷ The model thus becomes an essential tool to check and control the validity of reconstructive hypotheses and the congruence between the building elements.

Moreover, 3D computer models allow more enhanced and controlled interaction with users due to the fact that they are able to cover the whole range of possible models in a single system of representation.¹⁸

As Gaiani notes

conceived as real maquettes, which live in a virtual space perfectly corresponding to the real one, so much to offer all the four dimensions, the models carried out by means of computer are then observed through a screen..., with capacities to vary the point of view in order to simulate the mobility and the transformability in the time and in the appearance.¹⁹

The increasingly enhancements of digital technologies, also in the field of renderings, makes possible that many reconstructions appear with a high-level of photorealistic imagery: digital processed images seem to be photographs of a real object, represented as if it had just been built. In this case, photorealism become sometimes hyperrealism overcoming the limits of truth likeness.

On the other hand, Dotto notes that the use of drawing and modelling as tools of communication, differently from the photograph, activates the processes of imagination and interpretation of spaces and shapes. For this reason he promotes the use of orthographic projections, isometric cutaway, perspective sections, and graphic overlays. Similarly, surface treatments and lightings rather than pursuing photorealism and truth likeness should evoke the visible reality using the instruments of graphic abstraction.

13 Giuseppe Pagnano, *La lettura critica: analisi di cinque opere di Adolf Loos* (Catania: Istituto Dipartimentale di Architettura e Urbanistica dell'Università di Catania, 1975); Mario Ducci, *Disegno e analisi grafica* (Roma-Bari: Laterza, 2009); Piero Albasini and Laura De Carlo (eds.), *Architettura disegno modello: Verso un archivio digitale dell'opera di maestri del XX secolo* (Roma: Gangemi, 2011).

14 Giuseppe Pagnano, "Presentazione," in Francesco Maggio and Marcella Villa, *Architettura demolita* (Palermo: Edizioni Caracol, 2008), 7–10.

15 Riccardo Migliai (ed.), *Drawing as Model* (Roma: Edizioni Kappa, 2004).

16 Kent Larson, *Louis I. Kahn: Unbuilt Masterworks* (New York: The Monacelli Press, 2000).

17 Roberta Spallone, "3D digital modeling as a method for the reconstruction of the historical image of the city: the case of piazza Bodoni in Turin (Italy) at the end of nineteenth century," *ISPRS Archives* 36, no. 5/CS3 (2007), 685–690.

18 Tomas Maldonado, *Realtà e Virtuale* (Milano: Feltrinelli, 2005).

19 Marco Gaiani, "About the drawing and the model: Representation for industrial design," *Drawing as Model*, edited by Riccardo Migliai (Roma: Edizioni Kappa, 2004), 91–98.

We share Dotto's figurative choices preferring 3D models characterized by conceptual materials, diversified by opacity, transparency, reflection and natural enlightenment. This latter kind of render allows appreciating the shape generation, the geometric relationships between the building and its context, the perception of the interior and exterior spaces.

Moreover, we share with Ogleby the idea that 'what is lacking presently is both an ontology for visual literacy in the area of virtual heritage, and some method of adding to the viewer's understanding through the supply of supporting information'.²⁰

According with Ciagà the 'revolutionary capacity of current 3D models is inherent to the specific characteristics of digital technologies which offer the possibility to directly explore virtual spaces and "enter" inside with the aid of specific applications of interface design and interaction design'.²¹

Moreover, 3D modelling provides 'methods of visualization which are otherwise impossible in the tangible reality, allowing the integration of fragments, the inspection of objects in all their physical coordinates, their three-dimensional existence: in short, they exponentially heighten tools of analysis, research, study, but at the same time even those for the communication of historical information'.²²

The ability to access the fourth dimension, through the construction of a sequence of images, constitutes a specific prerogative of the digital representation, which goes beyond the static constraint imposed by the conventional methods of representation.²³

Manovich dates back the rise of the movie camera as a universal paradigm for interaction with data represented on three dimensions to the 1980s and 1990s, when the interaction between users and virtual models through an interface began to use actions like zooms, tilts, pans and tracks.²⁴

The production of movie and animation of 3D models has to focus on well-organized sequences relating to space, event and movement.

20 Cliff Ogleby, "The 'Truthlikeness' of Virtual Reality Reconstructions of Architectural Heritage: Concepts and Metadata," *ISPRS Archives* 36, no. 5W47 (2007).

21 Graziella Leyla Ciagà, "Digital reproductions and reconstructions: Historical research, knowledge dissemination and performance," *Design & Cultural Heritage. Immateriale virtuale interattivo / Intangible Virtual Interactive*, edited by Fulvio Irace (Milano: Electa, 2013), 164.

22 Fulvio Irace, "The Animated Archive," *Design & Cultural Heritage. Archivio Animato / Animated Archive*, edited by Fulvio Irace and Graziella Leyla Ciagà (Milano: Electa, 2013), 13.

23 Giorgio Garzino, Roberta Spallone and Massimiliano Lo Turco, "Digital strategies for knowledge based models," *Drawing (and) Information: Polytechnic Drawing*, edited by Giorgio Garzino (Sant'Arcangelo di Romagna: Maggioli, 2011), 70–111.

24 Lev Manovich, *The Language of New Media* (Cambridge, MA: MIT Press, 2001).

As Engeli noted, the creation of specific messages relating to space requires an in-depth knowledge of the characteristics intrinsic to the different possibilities and to the aspects that are wished to emphasize.²⁵

The animation, as a tool of the digital reconstruction, highlights its potential in enabling the exploration and dynamic perception of objects, spaces and contexts that no longer exist, or never really existed, but also to represent thematic readings such as periodization, decompositions, building sequences that find the most effective means of communication in the fourth dimension.

During the previous MoMoWo Symposiums, several works by female architects were highlighted by means of reconstructive digital modelling. These analyses were proposed by a research group led by Francesco Maggio, a pupil of Giuseppe Pagnano, who started in the early 2000 to apply the graphical analysis and reconstructive digital modelling methods to unbuilt architectures by female architects of the Modern Movement.

Among the works which constitute the State of art on the topic we can remember the research led by Piero Albinini and Laura De Carlo aimed to create a digital archive containing models of the Twentieth century masters,²⁶ the one aimed at the construction of the digital archive on Palladio,²⁷ the one that relates architectural heritage of the late Twentieth century in Milan with the archives that document their design history.²⁸ Moreover, recently, a prototype of interactive model collection has been developed by Roberta Spallone and Francesco Carota for gathering reconstructive digital models and archival materials concerning several Molino's masterpieces.²⁹

25 Maia Engeli, *Storie digitali. Poetische della comunicazione* (Torino: Testo&Immagine, 1999).

26 Piero Albinini and Laura De Carlo (eds.), *Architettura disegno modello. Verso un archivio digitale dell'opera di maestri del XX secolo* (Roma: Gangemi, 2011).

27 Fabrizio Ivan Apollonio et al., "Geomodels for the PALLADIOLibrary," *Disegnare: Idee Immagini* 47 (2013), 46–59; Marco Gaiani et al., "A Mono-Instrumental Approach to High-Quality 3D Reality-Based Semantic Models: Application on the Palladio Library," *Digital Heritage* (2015); Guido Beltramini and Gaiani Marco, "Palladio Library - A growing virtualization project to understand Andrea Palladio," *Scries-it* 7, no. 2 (2017), 73–84.

28 Graziella Leyla Ciagà, "Digital reproductions and reconstructions: Historical research, knowledge dissemination and performance," *Design & Cultural Heritage. Immateriale virtuale interattivo / Intangible virtual interactive* edited by Fulvio Irace (Milano: Electa, 2013), 162–172.

29 Roberta Spallone and Francesco Carota, "Digital interactive Molino: A Collection of 3D Models from Carlo Molino Design Drawings," *Putting Tradition into Practice. Heritage, Place and Design*, edited by Giuseppe Anorusso (Cham: Springer International Publishing AG, 2017), 607–7.

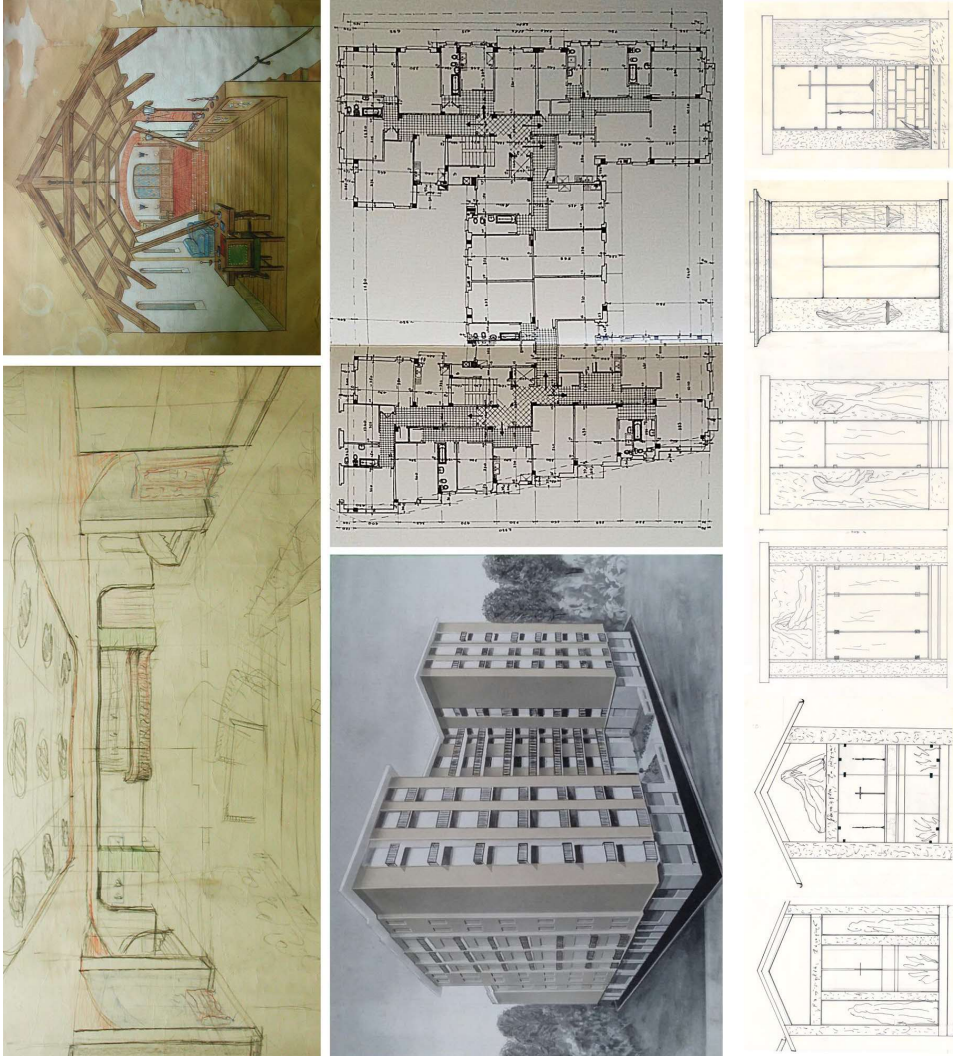


Fig. 2. Drawings from the professional archive of civil engineer Maria Luisa Spineto. From top, left: perspective sketch of Teatro Margherita in Genova, 1955, Private Archive (Pacco 12); water-colored perspective view of the interior of Casa Bellini in Arquata Scrivia, 1958, Private Archive (Pacco 24); perspective view and plan of Condominio Liberna in Arquata Scrivia, 1967–72, Private Archive (Cartella A12); study drawings for the façade of Tomba Lasagna in Arquata Scrivia, 1967–69, Private Archive (Pacco 35).

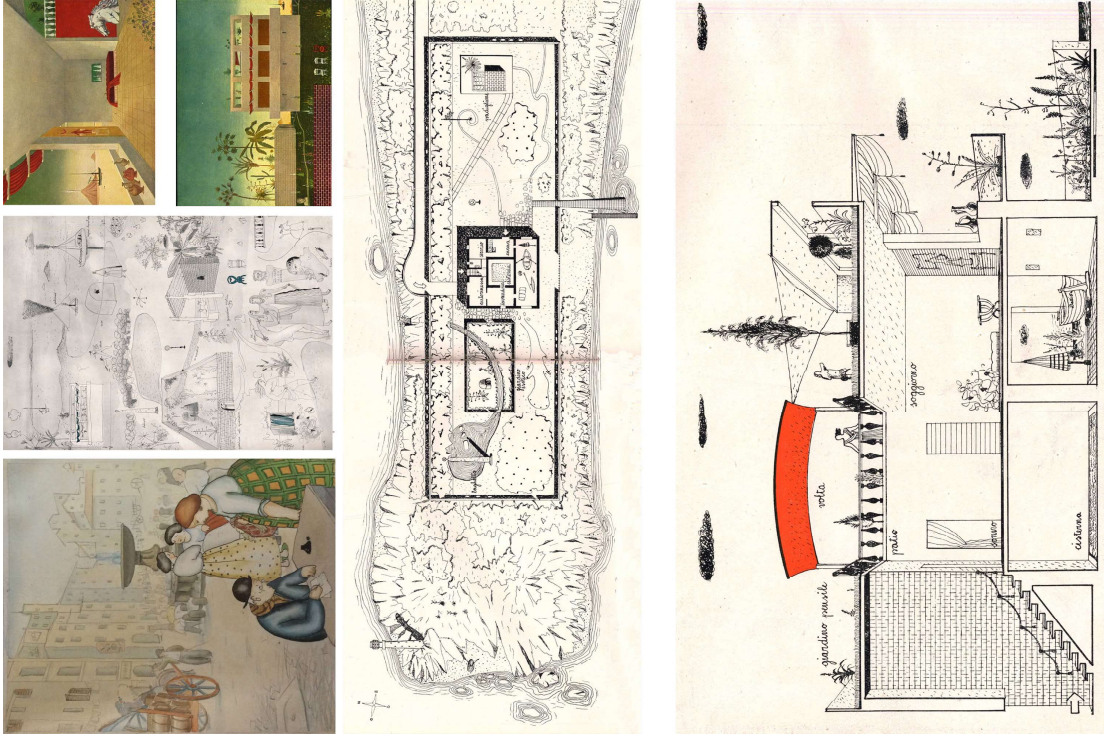


Fig. 1. Autograph concept drawings by Lina Bo Bardi for a house in Sicily. From top, left: Bo Bardi, Piazza Montanara, watercolor, 1929. From: Marcelo Carvalho Ferraz (ed.), *Lina Bo Bardi in Sicily* (Milano: Edizioni Charta, 1994); Bo Bardi and Pagani, ideas sketches for a house in Sicily, coloured interior perspective, coloured perspective of the façade, contextualized plan, perspective section, in Lina Bo Bardi e Carlo Pagani, "Casa sul mare in Sicilia," *Domus*, Agosto 30, 1940. (From: Francesco Maggio, "Lina Bo Bardi: Unbuilt in Sicily," MoMoWo: Women Designers, Craftswomen, Architects and Engineers between 1918 and 1945, edited by Marjan Groot, Helena Serazin, Caterina Franchini and Emilia Garda (Ljubljana: Založba ZRC, 2017), <https://doi.org/10.3986/wocrea/1/momowo125>).

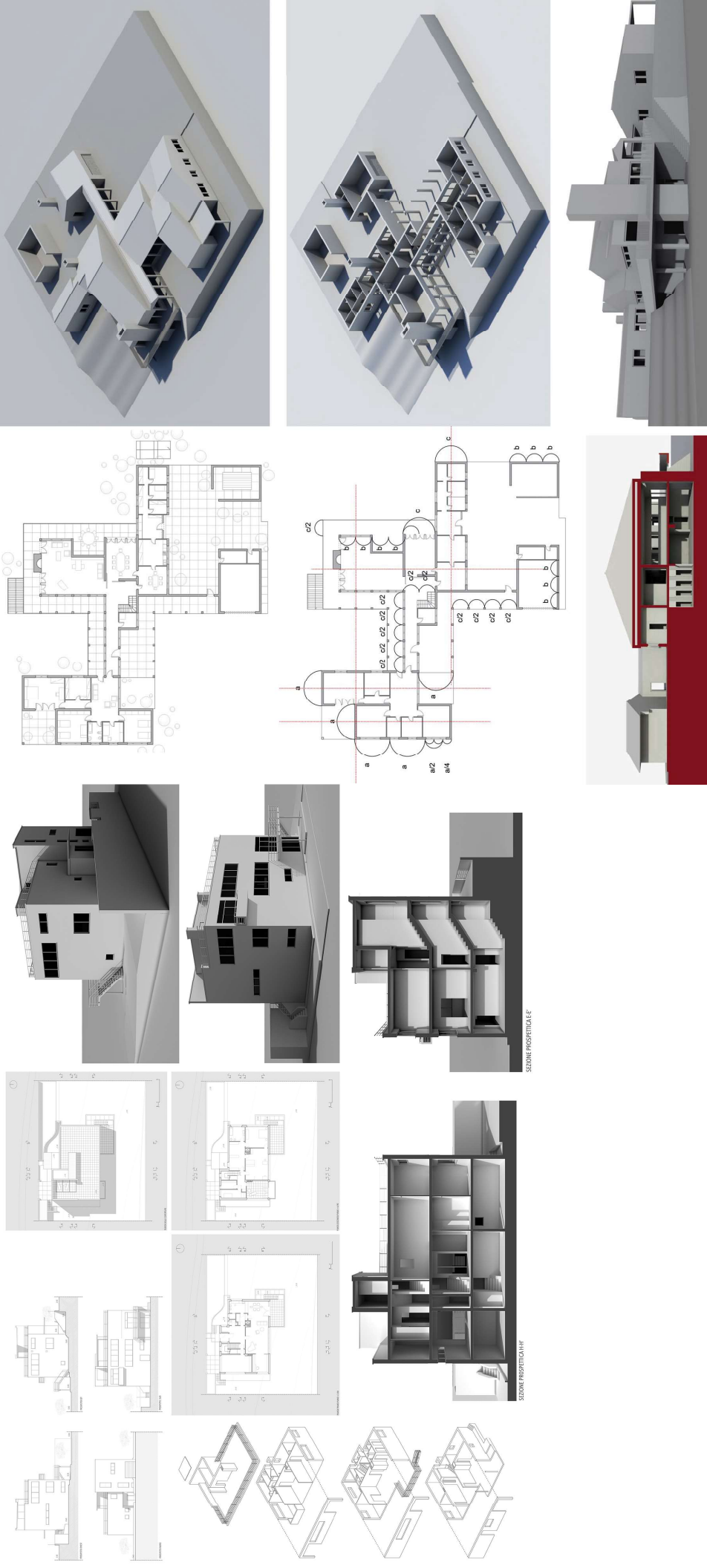


Fig. 3. 3D reconstructive models of *Villa Baling*, in Prague, 1932, by Hana Kučerová Zaveská. Plans, perspective sections and elevations, exploded axonometric view, perspective views of the exterior (3D modelling by Cinzia Garofalo, 2015).

Fig. 4. Graphical analysis and 3D reconstructive digital models of *House for Vicente Sebastián Léiga*, Pradolergo-Pozuelo de Alarcón, 1968–71, by Matilde Ucelay Maortua. From top: Left: redrawing and graphical analysis of the ground floor plan, exploded 3D models, section, perspective view of the exterior. (Graphical analysis and 3D modeling by Starlight Vattano, in Vattano, 2016).

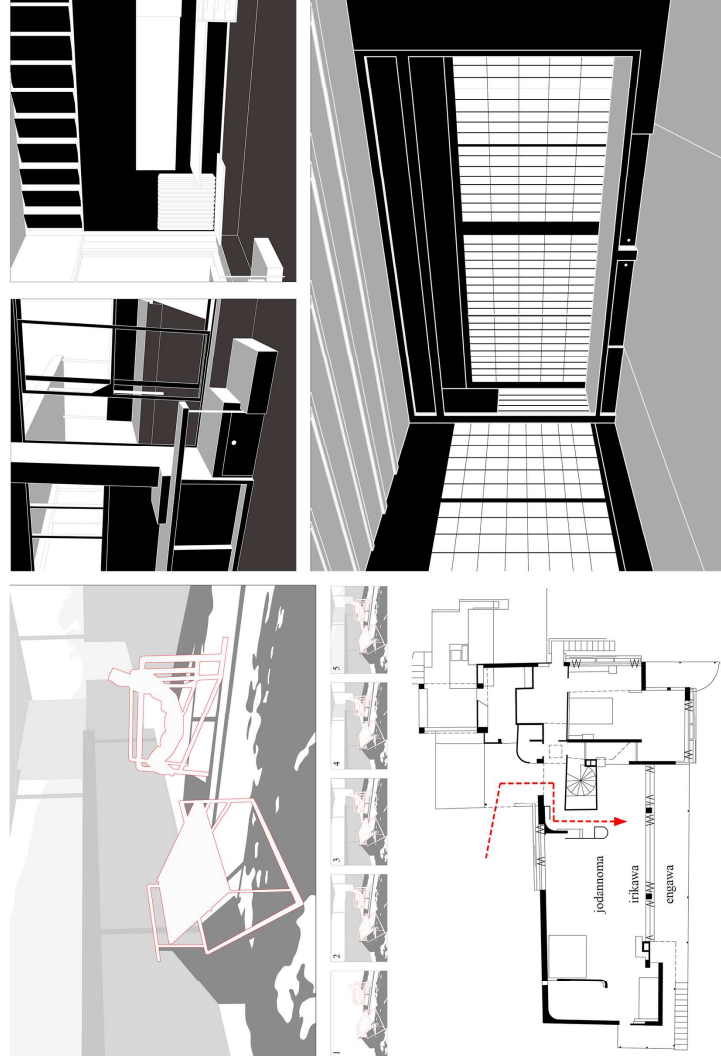


Fig. 5. 3D models and representations of House E.1027 (1928) and Tempe à Pailia (1932–34), by Eileen Gray. From the top: Tempe à Pailia layers into the experience of domestic space and 3D modeling. At the bottom: House E.1027, private and public areas/zones in the spaces of the house and 3D modeling (3D modeling and representations by Serafina Amoroso, 2015).