

A Study on Conceptions of Complexity in Architecture through Contemporary Architects' Design Theories

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1. Introduction

1.1 Background and Aim

Complexity is the state of being composed of several interconnected parts, the idea that has been used frequently in architecture. Especially since "Complexity and Contradiction in Architecture," written by Robert Venturi in 1966, marked a turning point in architectural thinking, numerous discussions emerged centering around complexity as one of the main aspects of the post-modern paradigm. Many architects have since adapted complexity in its positive sense to their design theories. However, due to the diversity of interpretation and realization, the term and its role in architectural practice remained uncertain. Given the strong influence on architectural discourse, this research aims to provide a limited overview of complexity conceptions through contemporary architects' design theories to reveal the transition in architectural thought since 1966.

1.2 Research Materials and Methodology

After the book "Complexity and Contradiction in Architecture," many interpretations of the ideas presented by Venturi have been published in architectural books and journals. These interpretations are essential for understanding the significance of Complexity Theory. Therefore, to provide a theoretical basis for this research, an analysis was made of the most important books and essays discussing Venturi's Theory of Complexity, published since 1966.

Following, the main analysis of Contemporary Architects' Conceptions of Complexity was carried out by extracting design theories with the keywords "complex" or "complexity," from internationally recognized magazines between 1966 and 2021. An example of the analysis and process is shown in fig. 1. The content of architects' design theories can be divided into the Aim of Complexity Conception, the Focus Point of Complexity, and the Method of Complexity. The Aim is defined as what architects want to realize using complexity in their design, and the Focus Point and Method of Complexity is the approach to realize the Aim.

2. Subject in Interpretation of Venturi's Theory on Complexity in Architecture

The emphasized points in discussion through publications on Venturi's Theory are defined as a Subject in Interpretation. Using the KJ method, the content of the Subject was divided into categories centering on Architectural Expression [A], Human Perception [H], and Environment Relation [E] (fig. 2). [A] includes cases discussing Venturi's theory mainly from the perspective of architects' expression which objectifies *Unique Appearance*, *Historical Appearance*, and *Symbolic Expression*. [H] represents Venturi's theory as a

relational system with the observer at the center and totally consists of *Semantics*. [E] assembles statements in which the emphasis is on the relation to the context and is defined by *Society Relation* and *Site Relation*. It can be seen that [A] takes the majority as it is almost 3 times bigger than [H], and [E] is almost 2 times bigger than [H]. *Historical Appearance* stands for half of the cases within [A], interpreting Venturi's 'conventional elements' as uncritically borrowed forms from the past, or criticizing the 'borrowings' in "Complexity and Contradiction" - for their inability to themselves reconstitute a coherent language - that culminates in kitsch. *Unique Appearance* and *Symbolic Expression* are weighted equally within [A], where the former is often discussed in relation to Venturi's emphasis on the visual and formal aspects, referring to his statements that "the eye does not want to be too easily satisfied," whereas the latter one underlines the problem of meaning and the symbolic dimension epitomized by Venturi. [H] is totally occupied by *Semantics*, including interpretations of how Venturi tries to "make space dialectical" so that it becomes readable, or critiques to be "dissolved into a deconstructed system of signals" with no desire to communicate. *Society Relation* dominates the [E] as it is almost 3 times bigger than *Site Relation*, where the former recognizes Venturi's acceptance of reality through pop vocabulary and anti-heroic forms, and the latter ties complexity theory to contextualism where forms can be adjusted to the empirical context.

3. Aim of Complexity Conceptions in Design Theory

3.1 Content of Aim

The content of Aim was analyzed in a similar way as the previous chapter and divided into categories [A], [H], and [E] (fig. 2). It can be seen that both [E] and [H] stand for more than 1/3 of the cases each, while [A] is a slightly smaller category, corresponding to about 1/4 of the cases. *Site Relation* is the overall largest aim in design theory, and is 2 times bigger than *Society Relation* within the same category [E]. *Site Relation* includes cases that aim at a relationship with physical context as topography or surrounding built environment, on the other hand, *Society Relation* consists of design theories where architects express the connection with a cultural, historical, or social situation to be the main aim. *Atmosphere* and *Perspective* are weighted equally within [H], including cases where architects aim at the creation of an experience for the observer. Cases within [A] mainly stand for *Unique Appearance*, when architects aim at distinct or sculptural expression and is almost 2 times larger than *Symbolic Expression*, in which architects want to incorporate symbolic meaning into their design. *Historical Appearance*

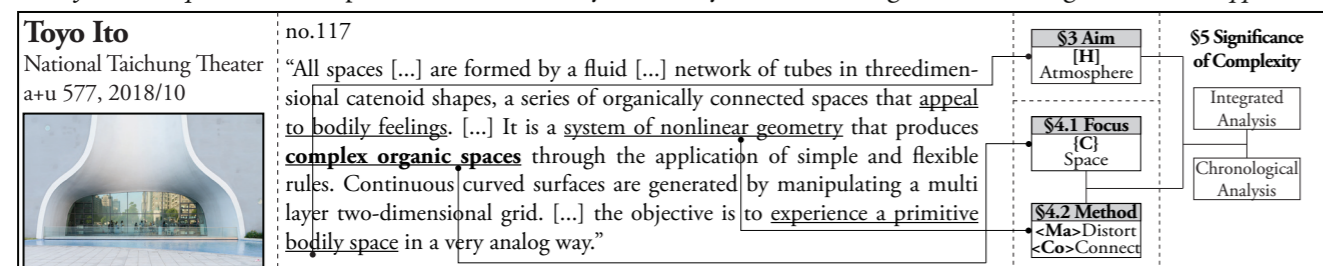


Fig. 1 Example of Analysis

only includes 1 example, imitating the language of the 18th century using complexity.

3.2 Comparison of Subject and Aim

A comparison was conducted to find out the relationship between the Subject and Aim (fig. 3). As mentioned earlier, [A] and [E] dominate the Subject, while [E] and [H] appear more frequently in Aim. The strongest difference is within [H], where the Subject only discusses *Semantics*, and Aim concentrates on *Atmosphere* and *Perspective*, no overlappings were found. Additionally, category [E] has two polarities, where Subject mainly discusses *Society Relation*, while Aim mainly emphasizes *Site Relation*. Finally, the Subject makes stronger attention to *Historical Appearance* within [A], while only 1 case in Aim could be identified as such. The comparison makes it clear that the Subjects discussed within the Interpretation of Venturi's Theory differ strongly from Contemporary Architects' Aims in Conceptions of Complexity. This suggests that contemporary architects' understanding of Complexity, considering the great influence of Venturi's Theory as one of the major architectural theories of 20th century, is not directly reflecting it. The difference between Subject and Aim is an important indication of the transformation of the interpretation of the original ideas first stated by Venturi, and the re-interpretations within contemporary design theory.

4. Focus and Method of Complexity in Design Theory

Besides diverse aims and understandings, architects' concep-

tions of complexity are also reflected through their realization approaches, which can be divided into aspects *Focus Point of Complexity* and *Method of Complexity*.

4.1 Content of Focus Point

The content of Focus Point was analyzed and divided into two categories Created Complexity {C} and Reflected Complexity {R} (fig. 4) through which the nature of complexity can be understood. {C} stands for complexity that is being brought up during design phase, while {R} constitutes of already existing complexity that is being referred to. {C} includes focus points *Form* (Fo), *Space* (Sp), and *Surface* (Su), while {R} includes *Urban* (Ur), *Nature* (Na), and *Society* (So). Considering the number in each category, architects tend to apply {C} in their design theories, which is about 3 times bigger than {R}. *Form* and *Space* dominate {C}, while focus points within {R} are not as frequent and are distributed evenly. Also, various combinations of focus points were found, although the number of the cases belonging to {C+R} is only 7 out of 121. The size ratio between the categories {C} and {R} can be interpreted as the difficulty of translating {R} into an actual design.

4.2 Content of Method

The content of the Method was analyzed and divided into two categories Manipulation <Ma> and Composition <Co> (fig. 5). <Ma> includes cases that *manipulate* the object of complexity using operations such as *Distortion*, *Differentiation*, and *Subtraction*. <Co> includes design theories

Category	Explanation	Chapter 2 Example of Subject	Chapter 3 Example of Aim
[A] 41 (V24)	Unique Appearance (V10) 28	Create an interesting and unique appearance with focus on architectural expression	[V02]-Importance of Venturi's book doesn't only consist in 'less is bore', but the analysis of spaces and facades as forms.
	Historical Appearance (V11) 1	Visually recall historical appearance	[V28]-This book opened a Pandora's box of exploration of architectural history in search of formal principles ...
	Symbolic Expression (V6) 12	Represent an idea through architectural expression	[V08]-In "Learning from Las Vegas" Modern architecture is criticized entirely on issues of symbolism .
[H] 54 (V12)	Semantics (V10) --	Deal with relationships between signs and meaning or interpretation they stand for.	[V17]-"Complexity and Contradiction" emphasizes the semantic complexities of the architectural message ...
	Atmosphere (V-) 30	Create an atmosphere or feeling focusing on the observer's impression	--
	Perspective (V-) 24	Create views and perspectives focusing on the observer's impression	--
[E] 59 (V19)	Site Relation (V5) 39	Create a relationship with the site context	[V03]-Venturi proposes a new urbanism, bending program and technology to the demands of place .
	Society Relation (V13) 19	Create a relationship with the social context	[V11]-Venturi's understanding reality is admitting that communication is based on non-architectural mechanisms ...

Fig. 2 Subject in Interpretation of R. Venturi's Theory and Aim of Complexity Conceptions through Design Theory

note: [V no.] - \$2 reference number
[no.] - \$3 reference number

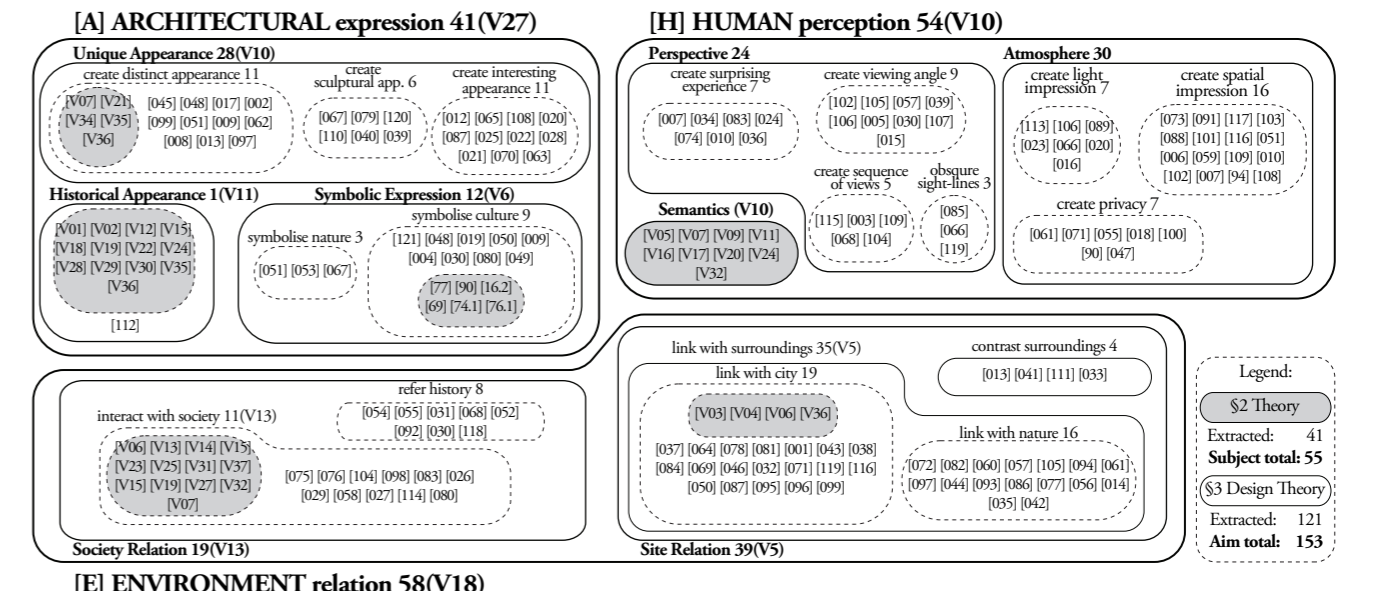


Fig. 3 Comprehensive Analysis of Subject and Aim

where architects describe the Method that *composes* several objects of complexity, applying operations such as *Combination*, *Juxtaposition*, and *Overlaying*. Considering the number in each category, <Ma> slightly exceeds <Co>. <Ma> is mainly dominated by *Distortion* and *Differentiation*, and the majority of cases in <Co> adopt *Combination*.

4.3 Integrated Analysis of Focus and Method

In this Chapter, the combination of Focus and Method reveals the Realization Type that was defined as the architects' approach to realizing the Aim of a conception of complexity. As seen in fig. 6, architects' approach can be described with 2 categories and 6 realization types. The largest category is occupied by design theories that *only* state {C}. Among this category the dominant type {C}+<Ma> corresponds for 40%, and the remaining is divided evenly between {C}+<Ma+Co> and {C}+<Co>. The minor category including design theories *with* {R} mainly consists of categories {R}+<Ma> and {R}+<Co> distributed evenly. The remaining type {R}+<Ma+Co> rarely comes up. Considering Focus Points within Realization Types: in {C}+<Ma> the *Form* is predominant, which is twice the *Space*, on the other hand, the situation with {C}+<Ma+Co> is reversed, and the *Space* is twice as large as *Form*. As for {C}+<Co>, the main Focus Points are also *Form* and *Space*, as in the previous categories, however, they have equal weight in this type. Given the minor category *with* {R}, the type {R}+<Ma> is the larger one and mostly contains Focus Points *Nature* and *Urban*, on the other hand, {R}+<Co> only consists *Urban* and *Society*.

5. Significance of Complexity in Design Theories

5.1 Relationship of Aim and Realization Type

Comprehensive Analysis as shown in fig. 7, represents the relationship between the Aim and the Realization Type. The significance of complexity conception in design theory is based on the tendency of each category of Aim to be realized through either *only* {C} or *with* {R}. The integrated analysis makes it clear that *only* {C} category is dominated by [H] with quite even Realization Types, though tending slightly towards <Ma>. More than half of the cases here be-

long to *Space*, especially concentrated in <Ma>. [E] is the smallest group within *only* {C}, where Realization Types are almost same size. Both *Form* and *Space* are evenly distributed, however <Ma> is here totally dominated by *Form*. In [A] both <Ma> and <Co> are dominant, while <Ma+Co> is quite rare. To summarize the results of fig. 7 it is clear that contemporary architects tend to apply spatial manipulation and composition while creating complexity aimed at an experience for the observer, while manipulation of form is most common realization type during creation of complexity mainly aiming at architectural expression. In cases when architects want to create a relation with the surrounding environment, both formal and spatial compositions can be applied, however manipulation of form is slightly exceeding other realization approaches.

5.2 Chronological Analysis

According to the content of fig. 7, chronological changes in Realization Types are drawn in fig. 8, which reflects the transition in architectural thinking since the mid-1960s. The top half of the figure illustrates the Subject in Interpretation, which appears to be consistent over time, except for the period between 1966 and 2015, when the number of cases first declined, consisting mainly of [A], then grow slightly. Given the social situation and the emergence of postmodernism during the first two decades after the publication of "Complexity and Contradiction", the number of cases suggests that the discussion of Venturi's Theory on Complexity was indeed relevant and widespread. Toward the end of the 1980s, the trend in architectural discourse changed with the emergence and growing popularization of new digital technologies, which may be associated with a drop in numbers. Following 2016, there has been a renewed interest in interpreting Venturi's Theory on Complexity that could be connected to several essays and new reviews published in connection with "Complexity and Contradiction" turning 50 years. The lower part of fig. 8 shows the chronological change of Complexity Conceptions through Design Theory. During the first two decades, the emphasis is on {C}, with [E] forming a minor part, suggesting the beginning

of contextualist thinking after the collapse of the Modernist age, while ideas of architectural expression are strong. After the mid-1980s, the decline in interest in Complexity Theory can also be explained by the increased attention to new digital technologies, as well as the fact that contextualism has become the norm in architectural discourse. [E] starts to rise and peaks between 2006 -2015, including [R] more frequently, while [A] drops significantly. Also, the growing attention to [H] and [E] would be a clear suggestion that Complexity Theory is an effective tool clarifying recent developments in architectural discourse concerning human and environmental issues.

6. Conclusion

An analysis was made on Conceptions of Complexity in Architecture based on Contemporary Architects' Design Theories from magazines and compared with Interpretations of Venturi's Theory on Complexity through publications. It is clear that not only does each architect have own understand-

ing, aim and realization approach to complexity, but also differs strongly from one period to another and follows or contrasts with the original theory first stated by Robert Venturi in 1966. A general tendency by the contemporary architects was noticed toward creating unique experiential and expressionistic qualities through the complexity of form and space, rather than discussing issues of representation and social aspects by reflecting on the complexity that surrounds us. Contemporary architects also seem to apply conceptions of complexity, focusing on the relationship to the physical context of a place rather than societal relations. However, the increasing use and exploration of complexity's significance in recent decades have led to a more concrete and less metaphorical approach, for which Venturi's complexity theory has been criticized.

Notes:
1) The material for Interpretation of Venturi's Theory on Complexity mainly consists of books from the digital library *Internet Archive.org* and architectural journals *Perspecta*, *Oppositions* and *Assemblage*.
2) A total of 121 Design Theories between 1966-2021 were selected from *A+U* (71), *Architectural Record* (33) and *El Croquis* (17).

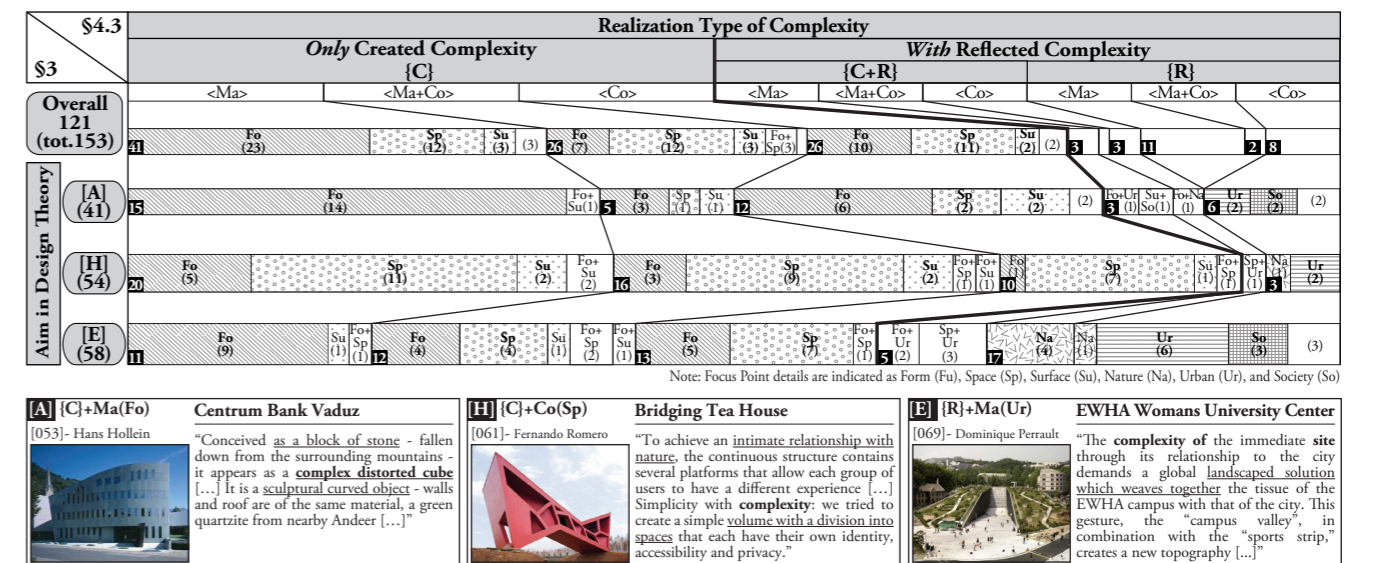


Fig. 7 Relationship of Aim in Design Theory and Realization Type of Complexity

Chapter 4.1 Example of Focus Point	Focus Point tot. 139	Project tot. 121
[054]-Planes flatten out and rise. This lends a formal complexity in tension of static and dynamic forms.	Form 52	Created Complexity 109
[039]-Spatial complexity generated by an interplay of solid elements	Space 43	
[113]-The dome's complex pattern is the result of superimposed layers.	Surface 14	
[035]-[...] underlining the complex topographical situation.	Nature 9	
[064]-[...] complex urban architectural situation.	Urban 13	Reflected Complexity 30
[093]-[...] complexity of site's cultural characteristics.	Society 8	

Fig. 4 Focus Point of Complexity through Design Theory note: The difference in Focus Point tot. and Project tot. is due to Projects with more than one Focus Point, for details see Fig. 6

Scheme	Chapter 4.2 Example of Method	Method tot. 167	Project tot. 121
[074]	[074]-By extruding and pressing simply shaped houses become complex configurations in space [...]	Distort 42	<Ma> (55)
[052]	[052]-Our plot forms a complex and sculptural geometry, with volumes of various heights [...]	Differ 36	
[074]	[073]-Formal complexity comes from basic geometric abstractions at the corners of a primitive mass [...]	Subtract 14	<Ma+Co> (29)
[074]	[074]-Complexity of the interior space arises from the angular intersection of the individual houses [...]	Combine 46	
[044]	[044]-combination and juxtaposition of volumes creates spatial complexity in relation to the landscape.	Juxtapose 16	<Co> (37)
[103]	[103]-Fiberglass frames stacked on top of each other, a complex three-dimensional environment is created [...]	Overlay 13	

Fig. 5 Realization Method of Complexity through Design Theory note: The difference in Method tot. and Project tot. is due to Projects with more than one Method, for details see Fig. 6

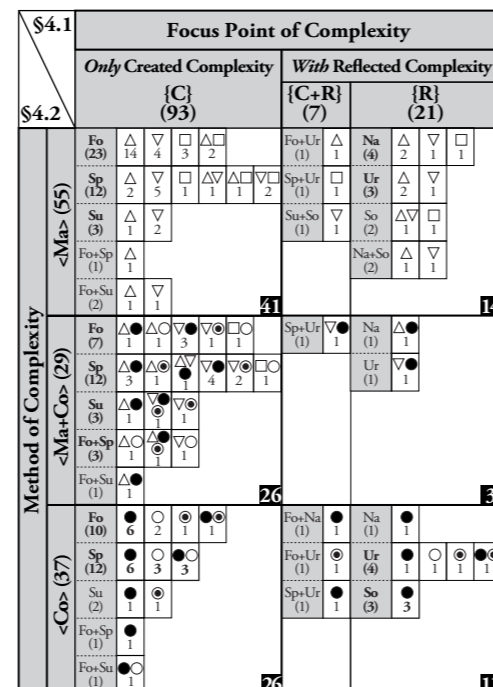


Fig. 6 Realization Type through Focus and Method of Complexity

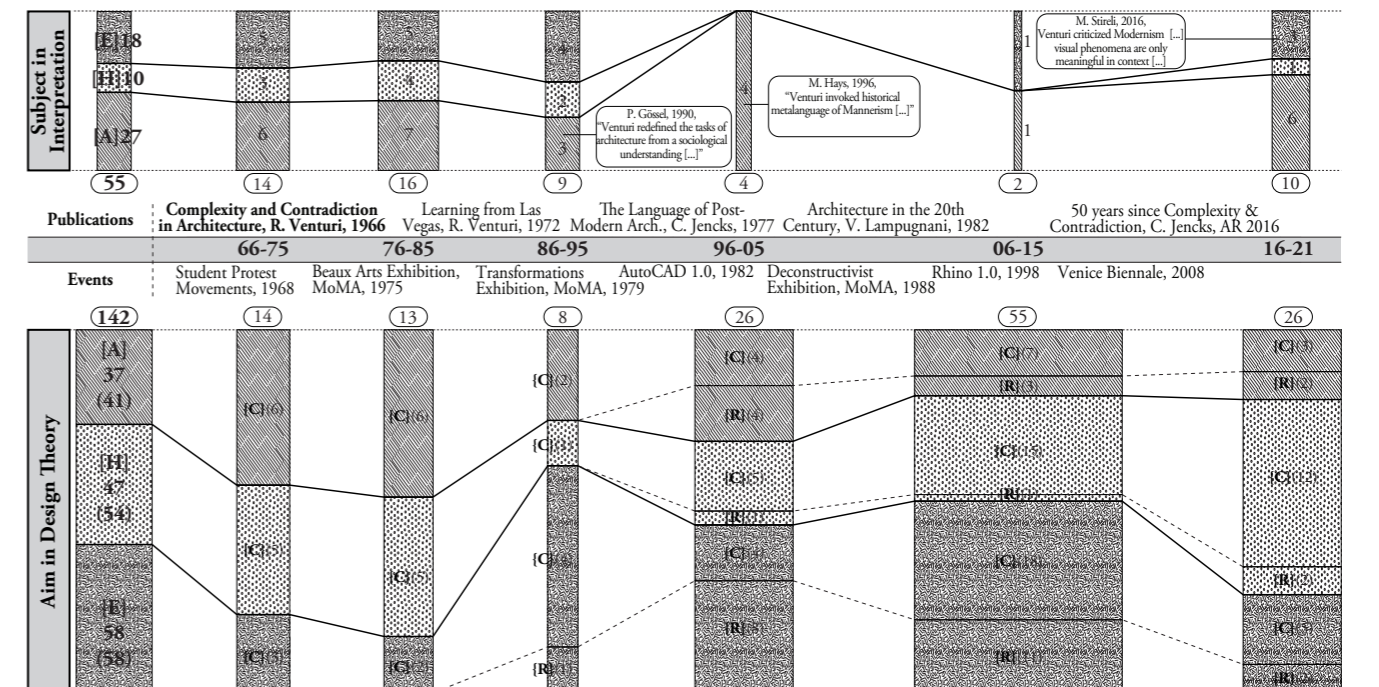


Fig. 8 Chronological Analysis