Athens Journal of Architecture

Quarterly Academic Periodical,
Volume 9, Issue 3, July 2023
URL: https://www.athensjournals.gr/aja
Email: journals@atiner.gr
e-ISSN: 2407-9472 DOI: 10.30958/aja

Front Pages

Athens Journal of Architecture

Published by the Athens Institute for Education and Research (ATINER)

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The Athens Journal of Architecture
ISSN NUMBER: 2407-9472- DOI: 10.30958/aja
Volume 9, Issue 3, July 2023
Download the entire issue (PDF)

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Editorial and Reviewers' Board

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Gregory T. Papanikos
President
ATINER

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Athens Journal of Architecture - Volume 9, Issue 3, July 2023 – Pages 257-280
(received: 6 July 2022, received in revised form: 22 February 2023, accepted: 17 March 2023)

Acknowledging the Dignity of Architectural Heritage Adding a Fourth Virtue to the Vitruvian Triad

By Nicholas Clarke[*] & Marieke Kuipers[±]

Addressing the complex legacies of the past in architectural education and built constructions, calls for a reconsidering of the principles of architectural design and conservation. The current challenges of housing, sustainable development and heritage adaptation present huge dilemmas for architects. Yet today architects are only by exception trained to detect heritage values prior to drafting their interventions for adaptive reuse or upgrading. To this day, Western architectural thinking is influenced by the Vitruvian triad Firmitas, Utilitas and Venustas, and the truncated maxim 'Form Follows Function' as disseminated by the protagonists of the Modern Movement. These established a divide between the design for new-build and the care of already existing buildings. This divide is marked by the two Charters of Athens: the 1931 Carta del Restauro *adopted at the First International Congress of Architects and Technicians of Historic Monuments, and* La Chartre d'Athènes *presented by Le Corbusier as a result of the 4th CIAM Congress on the Functional City (1933). This paper attempts to bridge the identified divide by adding the idea of 'Dignitas' (dignity) as an equal virtue to the Vitruvian triad. Though not new for itself, this concept may aid to raise awareness of architectural dignity in extant buildings.*

Keywords: *architectural theory, architectural education, conservation theory, Renovation Challenge, Dignitas*

Introduction

Our built environment is changing faster than ever before, due to a variety of reasons including population growth, and a strong 'desire for the new', amongst many others. However, in Europe, more than 30% of all construction work is executed on extant buildings and this amount will increase in the immediate future.[1]

The perception of the potential values embodied by our built environment–be they social, cultural, historical or economical to name a few–is highly dependent on the observer. Their role can be as inhabitant, owner, estate developer, banker, political decision-maker, architectural or urban designer, et cetera. Seen in this light, it is remarkable that, particularly since the 1970s, but conceptually already since the 1920s, the majority of architects is mainly educated to design for new-build. Even if they are taught architectural history and may have some

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±Professor Emeritus, Delft University of Technology, The Netherlands.

1. European Construction Industry Federation, *FIEC 2021 Statistical Report, European Union* (European Construction Industry Federation).

consciousness of built heritage as a substantial part of the cultural identity of a place or landscape, they are rarely educated in the thoughtful 'art of adaptation' and its related design strategies. The omnipresent promotion of new-build has to be changed in favour of continuity and renovation, not only for cultural historical reasons, but foremost as an ecological urgency.

Despite their good intentions for improving the living and working conditions for all, the adepts of the Modern Movement actively contributed to transfer the throw-away mentality of the consumers society also to the construction world and building culture. During the post-World War 2 decades, when industrialization became widely implemented in construction, the cost ratio between wages and materials as presented for new-build increased manifold. Under the influence of the 'Form Follows Function' maxim as a leading concept for transforming the built environment for new needs, many architects and clients now focus on radically new creations, often at the expenses of the extant buildings. New developments in financing and real estate have also led to handle extant buildings as easily replaceable commodities or to accept years long vacancy of office buildings.[2] However, the dominant emphasis on (short-term single) functionality does not guarantee continuity of new-build on mid- or long term. Ongoing construction of new-build does not result in reduced waste and consumption of energy, material resources and space.[3]

To counter this undesirable reality, it is important to acknowledge that the built environment holds complexities of values which must be taken into consideration. Together these present the cultural resilience of a building, neighbourhood or landscape; they showcase the interdependency of matter and meaning, people and places.[4] The 2011 UNESCO Recommendation on the Historic Urban Landscape (HUL) provides helpful guidance to advance a better understanding of these interwoven tangible and intangible values.[5] A wider adoption implies a fundamental reconceptualization of architectural design strategies, doctrines and values, by which adaptation of the existing will be positioned central instead of (replacing) new-build.

Aim

In our view architectural theory and praxis must shift their focus from new-build to strategies of 'integrated design', which is based on thoughtful analysis of the existing buildings and their opportunities for continuity by means of well-considered and respectful interventions.

The aim of this paper is to investigate how such a reconceptualization could be heuristically grounded in the architectural consciousness and be communicated

2. H. T. Remøy, *Out of office: A study on the cause of office vacancy and transformation as a means to cope and prevent* (Amsterdam: IOS Press, 2010).

3. CBS, *Meeste afval en hergebruik materialen in bouwsector* (CBS, 2019).

4. N. J. Clarke, M. C. Kuipers, and J. Roos, "Cultural resilience and the Smart and Sustainable City," *Smart and Sustainable Built Environment* 9, no. 2 (2019): 144-155.

5. UNESCO, *Recommendation on the historic urban landscape* (Paris: UNESCO, 2011).

to raise awareness of the current urgency of the renovation challenge of the extant building stock. The scope is European, including some particular experiences from the Netherlands as examples of professional practice and architectural education.

Western architectural thinking is, to this day, deeply influenced by the triad *Firmitas, Utilitas* and *Venustas* of the ancient treatise of the Roman architect Vitruvius (Figure 1). Recent books on architectural theory take it expressly as the starting point for diachronic overviews.[6] Its presence is so pervasive in Western architectural theory that Kenneth Frampton sees no need to introduce either author or premise when referring to Gottfried Semper's "…departure from the Vitruvian triad" in his first essay in *Studies in Tectonic Culture.*[7] The Vitruvian triad forms thus a heuristic base for the architectural profession, while today it is often interpreted mainly in relation to designs for new-build. The research question is if this triad can and should be expanded by a fourth virtue of equal importance to aid a broader values-based approach to a general design process and a foundational principle in all dialogues about the necessary interventions for adaptation of the extant buildings.

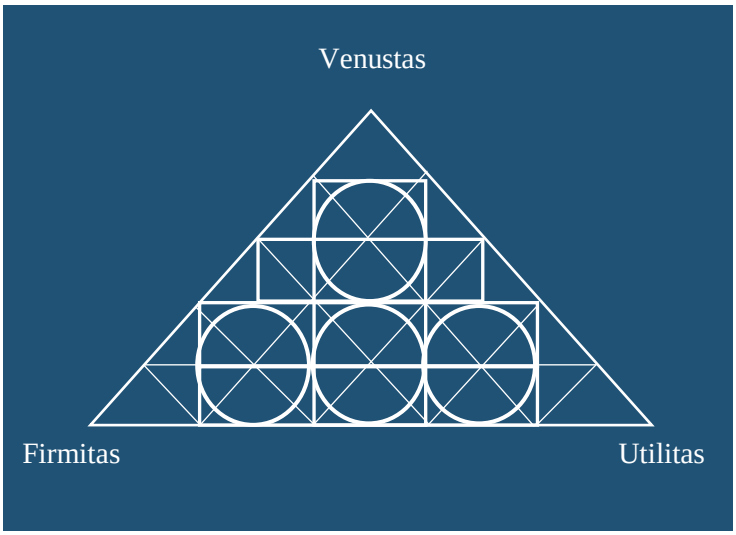

Figure 1. *Representation of the Vitruvian Triad with Firmitas, Utilitas and Venustas as the Main Virtues*

Although various proposals have been made in the past to expand the Vitruvian triad, there is still a need to look for a concept that overarches the qualities of the extant buildings as a polyvalent given, both in material and

6. B. Evers and C. Thoenes, *Architectural theory: From the renaissance to the present* (Cologne: Taschen, 2015); H.-W. Kruft, R. Taylor, E. Callander, E. and A. Wood, *A history of architectural theory: From Vitruvius to the present* (New York: Princeton Architectural Press, 1994); H. F. Mallgrave (Ed.), *Architectural Theory: Volume I: An Anthology from Vitruvius to 1870* (Malden, MA: Blackwell Publishing, 2006); K. Smith and Guitart, M. (Eds.), *Introducing Architectural Theory: Debating a Discipline* (New York; London: Routledge, 2012), 4.

7. K. Frampton, *Studies in tectonic culture: The poetics of construction in nineteenth and twentieth century architecture* (Chicago: Graham Foundation for Advanced Studies in the Fine Arts, 2001), 4.

immaterial sense. For instance, the German architects Johannes Cramer and Stefan Breitling provide an instructive overview of insights and design strategies for appropriate design in existing fabric, but they do not refer to the triad and mainly discuss the planning process, preparatory investigations and case-based design strategies, often applied to designated heritage buildings.[8] As another example, the continuities and discontinuities in vernacular architecture were analysed in-depth by the Greek academic-architect Maria Philokyprou and while we agree that this is "…a living organism that (…) cannot be put in ice during conservation", we are of the opinion that this statement goes for all buildings.[9]

How can we then, conceptually, advance an approach that results in continuity in all kinds of architecture, be it grown over time or the result of a carefully executed design by a renowned architect, and that acknowledges or even strengthens the embodied values?

It is clear that a clean break with current thinking is not possible or even desirable, but it is necessary to shift the focus towards the extant environment. In this search for a means to augment current architectural consciousness, we will, after a short introduction of the urgency of the current renovation challenge and its consequences for the architectural practice, discuss the prevailing doctrines for architecture and conservation, which have led to the establishment of a great divide. Following sections will deal with the method and positioning of this essay, a discussion of the urgency for a reconceptualization of architectural design strategies, current architectural design education in general based in part on short interviews and in the design education approach of the specific track of the Section for Heritage & Architecture at the Delft University of Technology (TUDelft). These sections will be followed by the presentation of our proposal for expanding the Vitruvian triad and our conclusions.

Method and Literature Review

In order to achieve the noted required reconceptualization, a literature review (embedded in the narrative of this essay) is undertaken to augment the already available findings of the PhD research *How Heritage Learns* in which both co-authors were involved.[10] It is further informed by reflection on architectural education practice, already published by the co-authors and their colleagues at the Section for Heritage and Architecture at the TUDelft (H&A). The H&A section was originally founded as the R-MIT (Research, Modification, Intervention and Transformation) department under leadership of former Dutch State Architect, Jo Coenen, based on his realisation that the challenge for the future lay in modulating

8. J. Cramer, and S. Breitling, *Architecture in Existing Fabric: Planning Design Building* (Basel: Birkhäuser, 2007).

9. M. Philokyprou, "Continuities and Discontinuities in the Vernacular Architecture," *Athens ATINER'S Conference Paper Series*, no. ARC2014-1311, 2014: 13.

10. N. J. Clarke, *How Heritage Learns: Dutch Public Housing Heritage Evolution in Ecosystemic Perspective* (Delft: TUDelft, 2021).

the existing.[11] Therefore, Coenen transformed the pre-existing section for restoration into the re-use focussed R-MIT. To further substantiate our research, semi-structured interviews were conducted with two Dutch architects who have been awarded for their adaptive reuse projects.[12]

Many books are now available on 'adaptive reuse' and 're-architecture' but the fundamental issue remains how architects can best be guided to expand their theoretical frame of references for the 'art of adaptation'.[13] Alkemade *et al.* present "10+1 Actions" for dealing with the existing, but they only provide executed responses in built form, no guidance for analysis.[14]

The conclusions to this paper research are the result of a critical reflection on education experience and design practices as well as a process of continuous debate between the two researchers/co-authors and their colleagues.

Urgency: The Renovation Challenge

Political awareness has recently grown globally, and particularly in Europe, that our built environment is urgently in need of adaptation to reduce energy consumption. Built environment professionals are also realising that the life-cycle environmental cost of construction can be reduced by re-use.[15] The option of demolition for new-build is becoming less and less viable due to the high environmental costs that this replacement brings and the waste of embodied carbon in the process.

The 2015 *Paris Accord* includes the ambition to limit global temperature increase brought about by human activity to 1.5°C above pre-industrial levels.[16]

11. N. Clarke, H. Zijlstra, and W. de Jonge, "Education for Adaptive Reuse: The TU Delft Heritage and Architecture Experience," *Docomomo Journal* 61, no. 3 (2019): 67-75; N. Clarke, M. Kuipers, and S. Stroux, "Embedding built heritage values in architectural design education". *International Journal of Technology and Design Education* 30, no. 5 (2020): 867-883; N. Clarke and M. Kuipers, "Introducing the Heritage Value Matrix: Connecting Matter and Meaning in Built Heritage," in *Proceedings IMaTTe2017- Intangibility Matters - International Conference on the Values of Tangible Heritage* (eds.), M. Menezes, D. Costa and J. Rodrigues, 207-216. Lisboa: LNEC, 2017; M. Kuipers and W. de Jonge, *Designing from heritage: Strategies for conservation and conversion* (Delft: TU Delft, 2017); J. Coenen, *The art of blending* (Delft: R-MIT, 2006).

12. Interviews conducted via the Zoom platform on 13 June 2022. Both interviewees were forwarded a list of five questions for consideration in advance of their interview. The interview took the form of a semi-structured dialogue and was recorded with the permission of the interviewees for further reference/transcription. This paper was shared with the interviewees before submission to get their consent.

13. A. Tostões, and Z. Ferreira (Eds.), *Adaptive reuse: The Modern Movement towards the future* (Lisbon: Docomomo International, Casa da Arquitectura, 2016); S. Cantacuzino, *Re-architecture: Old buildings/new uses* (New York: Abbeville Press, 1989); C. Bloszies and H. Hardy, *Old buildings, new designs: Architectural transformations* (New York: Princeton Architectural Press, 2014); F. Scott, *On altering architecture* (London: Routledge, 2008).

14. M. van Iersel, "Heavy World," in *Rewriting architecture: 10+1 actions: Tabula Scripta* (eds.) F. M. Alkemade, M. van Iersel, M., Minkjan and J. Oudenburg (Amsterdam: Valiz, 2020), 30.

15. See for instance Preservation Green Lab, *The Greenest building: Quantifying the environmental Value of building reuse* (National Trust for Historic Preservation, 2012).

16. United Nations, *Paris Agreement* (Paris, 2015), Article 2, 1(a).

Globally roughly 17,5% of all greenhouse gas emission is related to the operation of the built environment, and in Europe buildings are responsible for no less than 36% of all greenhouse gas emissions from energy.[17] Reducing both energy use and the associated environmental damage of operating our buildings is therefore essential to reaching set climate goals, but so far the practical consequences for our building and design strategies have hardly been investigated.

The 2019 *European Green Deal* aims to make Europe the first climate-neutral continent on the planet and has far-reaching consequences for all facets of life as we know it, also for the built environment. The European Commission's *Renovation Wave Strategy*, conceived to improve energy performance in buildings, was launched in October 2020. This programme has the ambition to at least double the rate of building renovations, to achieve energy renovation of 35 million buildings in Europe within 10 years. Its authors believe that it: "…can trigger a large-scale transformation of our cities and built environment. It can be an opportunity to start a forward-looking process to: …*match sustainability with style* [italics by the authors]."[18]

The current EU Energy Performance of Buildings Directive makes an exception for buildings with historical value; Member States have the option not to apply European minimum standards in renovation in (a) building(s) that are officially protected as part of a designated environment or because of their special architectural or historical merit, in so far as compliance with certain minimum energy performance requirements would unacceptably alter their character or appearance.[19] However, seeing the urgency and existential nature of the climate crisis, it is inconceivable that any in-use building, no matter its heritage status, will not be affected by physical interventions – whether this is by other forms of energy production (photovoltaic and solar hot water), insulation, or adaptation to new use.

Renovation and adaptive re-use will thus become the main task for professional practice in the built environment in the immediate future. We must now consider the built environment as a whole, as a cultural product being of great value. All built fabric holds ecological value and could potentially also hold social meaning and/or cultural and historical value.

Acknowledging that a large portion of the extant built stock will remain with us and require careful adaptation, we need, according to the chairman of the United Kingdom's Climate Change Committee, Lord Deben: "…to think differently. It's not acceptable to pull buildings down like this. We have to learn to make do and mend."[20] The question is how will we learn and educate, specifically architects and builders, and address issues of ethics and aesthetics in relation to adaptation and architectural design in order to 'match sustainability with style'.

17. I. Ghosh, *A Global Breakdown of Greenhouse Gas Emissions by Sector* (Visual Capitalist, 2020).

18. European Commission, *New European Bauhaus: Commission launches design phase.*

19. European Union, "Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the Energy Performance of Buildings (Recast), EPDB 2010/31 EU) [2002 Recast])," *Official Journal of the European Union* (2010): L 153/13-35.

20. R. Harrabin, *Building strategy to look at embodied carbon, says government* (BBC News, 2022).

Diverging Doctrines

The American ecologists Sissel Waage and Robert Adams state that designers have historically not given much thought to the ripple effects of their decisions, but in view of the pressing renovation challenge, architects must now seriously rethink their position towards the extant buildings and their responsibility for a lasting availability of material resources and more.[21] Such an ecological responsibility stretches beyond the already existing obligation to take care of the cultural resources as are embodied by the built heritage. It demands a fundamental paradigm shift in architectural thinking and design education as well as in construction industry and policy.

Alongside the Vitruvian triad another strong influence in Western architecture is the maxim 'Form Follows Function', originally coined by Louis Sullivan but widely disseminated by the protagonists of the Modern Movement.[22] These have prioritized the function of their new buildings, based on detailed analyses of–often single–uses and supposed needs of the occupants in relation to space.

As for *form*, Le Corbusier's famous essay on Five Points of Architecture, included in his polemic publication *Vers une Architecture* [Towards an Architecture, 1923], advanced a fundamentally new direction that broke ostentatiously with the stylistic idioms of the past.[23] His plea for a radically modern design approach, though informed by a personal understanding of ancient buildings of various civilisations, paved the way for a *tabula rasa* attitude towards architecture, as if there were no pre-existing or neighbouring buildings to relate to. It relied fully on the seemingly abundant availability of new construction materials, such as reinforced concrete, steel and large glass panes. By promoting the totally new, instead of adapting or maintaining the old, Corbu's plea reinforced the brutal transformations of the rural landscapes and urban fabric of old cities that came along with the Industrial Revolution and were further affected by the large-scale war-time destructions and slum clearances.

These sweeping changes were in part responded to by the heritage movement, which introduced the theory and practice of architectural and urban conservation as necessary counter-acts to the vandalism of historic buildings and sites. The 'proper' way to best conserve immovable heritage, as landmarks from the past, was a topic of fierce debate in many Western countries from the late 19C. onwards. A defining moment came when, under the aegis of the League of Nations, the First International Congress of Architects and Technicians of Historic Monuments was held in 1931 in Athens to formulate common principles and doctrines related to conservation. The resulting Charter of Athens, also known as *Carta del Restauro*, "…recognised that each case needed to be treated individually" and recommended "…that the historic and artistic work of the past should be respected, without excluding the style of any given period." In addition, it not only

21. S. Waage and R. Adams, *Adapting architecture and design for a resource-constrained world* (The Guardian, 2014).

22. H.-J. Henket and H. Heynen (Eds.), *Back from utopia: The challenge of the modern movement* (Rotterdam: 010 Publishers, 2002).

23. Le Corbusier and J. Giraudoux, *La Chartre d'Athènes* (Paris: Les Editions de Minuit, 1957).

recommended "…that the occupation of buildings, which ensures the continuity of their life, should be maintained but that they should be used for a purpose which respects their historic or artistic character.' It also proposed "…that educators should urge children and young people to abstain from disfiguring monuments of every description and that they should teach them to take a greater and more general interest in the protection of these concrete testimonies of all ages of civilisation." It is surprising, but also alarming, that by then already, "…the Conference noted that, in the conditions of present-day life, monuments throughout the world were being threatened to an ever-increasing degree by atmospheric agents".[24]

No indications were provided how *architects* should be educated for the complex task of *respecting* the historic monuments when interventions for repair or adaptation to new needs were required. Just one pragmatic conclusion stated that: "…modern techniques and materials may be used in restoration work". In other words, the firmness of the monument could be enhanced by applying modern means while the two other Vitruvian virtues were only implicitly addressed in relation to form or function. The overarching principle was that there would be a clear distinction visible between the old fabric (as historically reliable evidence of material authenticity) and the inevitable new additions for the continuity of the monument as a 'living' building to be passed on to community and future generations. The clear distinction was desired to avoid fake and false imitations, considered as 'lies to history', but the difficulty remained how new additions were to be designed and materialised in a contemporary yet respectful manner with regard to the historic monument.

Such questions had been addressed before; for instance, in the Netherlands where the Dutch Archaeological Association had issued general principles and guidelines for the conservation and extension of ancient buildings in 1917, and in 1922 during the tenth international congress of architects held in Brussels, but the Athens *Carta del Restauro* was the first international attempt to codify a common doctrine on the conservation of heritage.[25] This implied the predominance of preservation over renewal, for which it was tacitly agreed that (aesthetically) 'harmonious solutions' were to be designed in case of irreplaceable losses and new additions, similarly to the prescriptions of in the Dutch guidelines. This challenge was more than a matter of style or individual expression, it was also a test case of creativity and understanding the historic values. As example of the thinking of that time, Michel de Klerk's characteristic expressionist design for the upper part of the original Renaissance church tower in IJsselstein, which was lost in a fire in 1911. De Klerk's design was seen in the 1920s as an exceptional approach of the

24. International Congress of Architects and Technicians of Historic Monuments, *The Athens Charter for the Restoration of Historic Monuments, 1931*. ICOMOS.

25. J. Kalf and Nederlandse Oudheidkundige Bond, *Grondbeginselen en voorschriften voor het behoud, de herstelling en de uitbreiding van oude bouwwerken* (Leiden: G.F. Théonville, 1917); F. Choay (Ed.), *La Conférence d'Athènes sur la conservation artitique et historique des monuments (1931)* (Paris: Les Éditions de l'Imprimeur, 2002).

'restoration' assignment, acceptable to both conservation and contemporary architecture proponents only by virtue of its artistic merit (Figure 2).[26]

Figure 2. *IJsselstein, the Renaissance Tower of the Dutch Reformed or Old Saint Nicholas Church, Designed by A. Pasqualini (1532-35) with Expressionist Spire by Michel de Klerk as Post-Fire Restoration (1921-23) in 1962*
Source: G.Th. Delamarre, Cultural Heritage Agency of the Netherlands.

Meanwhile, design practice became overshadowed by the sharp conflicts among modernists and traditionalists about the right direction for contemporary architecture and urbanism against the backdrop of rising nationalism and economic decline.

Avant-gardists often opposed conservationists, claiming that in the case of historic city centres, the old had to make place for the new for the sake of progress.[27] The analytical functionalist approach of urban planning was collectively embraced and extensively discussed by the participants of the fourth international Congresses of Modern Architecture (CIAM, 1933), which took place far away from any built environment: on a cruise ship voyage in the Mediterranean *en route* to Athens. The outcomes, or rather his personal views, were later published by Le Corbusier as *La Chartre d'Athènes* in 1941-1942 and 1957, containing no less than 24 points of doctrine concerning the 'functional city'.[28] This charter, supported by Lluis Sert's provocative book *Can our Cities Survive?* (1942), was eagerly embraced by many architects and urban planners who were involved in the post-war rebuilding of the war-time devastated cities, such as Coventry, Le Havre,

26. J. A. C. Tillema, *Geschiedenis van de monumentenzorg in Nederland* (The Hague: Staatsuitgeverij, 1975), 146-150.

27. J. B. Van Loghem, *Bouwen bauen bâtir building. Holland…built to live in vers une architecture réelle neues bauen nieuwe zakelijkheid* (Amsterdam: Kosmos, 1932).

28. Le Corbusier and J. Giraudoux, *La Chartre d'Athènes* (Paris: Les Editions de Minuit, 1957).

Rotterdam.[29] They focused entirely on new-build designs for the distinguished main four urban functions–living, working, recreation and circulation–but mostly ignored the a fifth, culture, which would result in a call for the selective conservation of built heritage. In other cities, such as Middelburg, a mixed approach was adopted, sometimes rebuilding the pre-existing to its more or less historic forms (Figure 3).[30]

Figure 3. *(Left) Rotterdam, View of the rebuilt Hoogstraat, with Modernist Galeries Modernes Department Store (1954-57, Van den Broek and Bakema) and Restored Tower of the Laurens Church in 1975); (Right) Middelburg, View of Post-War Rebuilt Bachtensteene Street and Ancient Abbey Tower ('Lange Jan') with Reconstructed Top to the Design of Jan de Meijer, Shortly After Completion in 1955.*

Source: (Left) Gerard Dukker, Dutch Cultural Heritage Agency; *(Right)* Dutch Cultural Heritage Agency.

The dynamic interaction between the 'stories' that are communicated to construct the heritage significance and the 'stones' that are the material embodiment of the built heritage over time has today become a field of study in its own right, but the challenge remains how the valourised buildings can remain in use and passed on to future generations.[31]

29. J. L. Sert, *Can our cities survive?* (Cambridge, Mass: Harvard University Press, 1947); J. Düwel, and N. Gutschow (Eds.), *A blessing in disguise: War and town planning in Europe 1940-1945* (Berlin DOM, 2013).

30. J. M. Diefendorf, *Rebuilding Europe's Bombed Cities* (London: Palgrave Macmillan UK, 1990); J. Bold, P. J. Larkham, and R. D. Pickard (Eds.), *Authentic reconstruction: Authenticity, architecture and the built heritage* (London: Bloomsbury Visual Arts, 2020).

31. D. Lowenthal, *The heritage crusade and the spoils of history* (New York: Cambridge University Press, 1998); N. J. Clarke, *How Heritage Learns: Dutch Public Housing Heritage Evolution in Ecosystemic Perspective.* (Delft: TUDelft, 2021).

Effectively, the two Charters of Athens established a great divide between the design for new-build and the care of extant buildings. Sharing a strong belief in the separation and clear expression of new and old architecture, the doctrines encouraged a further divergence between conservation, which became more and more a specialised discipline, and the creation of contemporary architecture.[32] Time has come to bridge the gap and to search for a more holistic approach to adapt the current building stock to new needs of sustainability, safety and continuity of life.

Architectural Design Education

During the post-war decades the divide between modernist architectural thinking and doctrinal conservation theories become increasingly deep, particularly after the adoption of the Charter of Venice (1964) and the subsequent rise of starchitects like Norman Foster and Rem Koolhaas. The divide was further expanded by continuous developments in education, economy and policy. Today a persistent 'cult of newness' prevails at the expenses of the recent heritage and the material resources.[33] As a result of frequent renewal in architectural education and the continuous promotion of modernity, the longing for newness has become dominant whereas the knowledge of historical construction methods and materials is only transferred, and applied, by a handful of specialists.

The rich handbook *Constructing architecture*, compiled for architectural education in 2005, builds on another triad in an analogy with language stating that architecture has: '…material vocabulary (modules), a constructive grammar (elements) and a structural syntax (structures)'.[34] It also refers to Kenneth Frampton's distinction of the "…constantly evolving interplay of three converging vectors, the topos, the typos, and the tectonic".[35] Although the Vitruvian triad is not mentioned explicitly in this handbook, the cited triads may be interpreted as relevant reverberations of the same observation that a sensible composition of architecture is always the result of a complex interaction of three different factors.

The Belgian academic-architect, engineer and poet Richard Foqué utilises the Virtuvian Triad as basis for his conceptual model for architectural research in which he equates *Firmitas* to *Science and the Mind*, *Venustas* to *Art and the Soul* and *Utilitas* to *Design and the Body*. He presents another triad in the form of a triple helix, representing the domains of *form*, *context* and *function*; a

32. M. Glendinning, *The Conservation movement: A history of architectural preservation: antiquity to modernity* (London: Routledge, Taylor & Francis Group, 2013), 200.

33. M. C. Kuipers, "Leegte en overvloed: De nieuwheidscultus in de naoorlogse architectuur van Nederland," in *Gered, gesloopt, bedreigd, omgaan met naoorlogs erfgoed* (eds.) A. de Back, J. Coenen, M. C. Kuipers, and W. Röling. (Rotterdam: Episode, 2004), 18-25.

34. A. Deplazes, "Preface," in *Constructing architecture: Materials, processes, structures: a handbook* (ed.) A. Deplazes (Basel: Birkhäuser, 2018), 10.

35. C. Elsener, "How to use this book," in *Constructing architecture: Materials, processes, structures: a handbook* (ed.) A. Deplazes (Basel: Birkhäuser, 2018), 11.

reinterpretation of the Vitruvian triad.[36] His use of the double-helix is an analogy between buildings and DNA and organisms and this may be useful for establishing another attitude towards the extant built environment by including associations with life, presence and continuity.

By placing a selection of the inherited building stock as designated monuments/ historic buildings under statutory protection, they are, according to many contemporary architects, set apart from daily life. Such designation is seen to limit architect's creative powers when designs for adaptive reuse or technological upgrades are required. These architects, rarely taught to look further than the Vitruvian triad *Firmitas, Utilitas* and *Venustas* and the slogan 'Form Follows Function', often see listed monuments as a hindrance. This, when dealing with the existing, creates a prejudice against the potential for functional matches and assumed cost-effectiveness is the prevalent consideration when deciding on reuse or demolition.

Departing from the triad and critically reflecting on the results of the fast processes of (functional) ageing and the dogmatic attitude of the modernists towards built heritage, Dutch architect Hubert-Jan Henket, co-founder of DOCOMOMO, introduces 'performance management' and 'life cycle conscious thinking' as essential concepts to get grip on the undesirable process of 'throw away' building.[37] The English architect John Allan, specialist in the conservation of modernist heritage, underpins also that: "the green agenda and sustainability issues are suggesting larger arguments for thinking carefully about the embodied value of previous investment before scrapping it in favour of redevelopment."[38]

Yet the problem remains that most lessons for architectural students are still directed at the creation of entirely new buildings. Many designers of today lack an appropriate training in dealing with the existing built environment. So, they seek wilful contrasts to make their interventions clearly contemporary – often under the pretext of 'reversibility', implying that the new additions and infills can be made undone and that the previous situation could then be restored without harm. However, when seen in longer chronology this feigned reversibility is an act of self-harm: a waste of financial, material and environmental investments. At the same time, various specialised heritage architects in conservation do not always look for creative solutions for the necessary interventions to allow new functions or to upgrade the functionality of a built heritage site. Some do, however, like the well-known Dutch renovation architects, Annette Marx and Job Roos.

For this paper we interviewed both about their design attitude when dealing with built heritage for adaptive reuse.[39] We asked specifically if they were familiar with the Vitruvian triad and, if they had, if it had guided them in their work. While

36. N. J. Clarke, *How Heritage Learns: Dutch Public Housing Heritage Evolution in Ecosystemic Perspective* (Delft: TUDelft, 2021), 53.

37. H-.J. Henket, (*Waar oud en nieuw elkaar raken. Een pleidooi voor houdbare moderniteit in de architectuur* (Eindhoven: Lecturis, 2013), 301-326.

38. J. Allan, "Points of balance: Patterns of practice in the conservation of modern architecture," *Journal of Architectural Conservation* 13, no. 2 (2007): 44.

39. The following sections summarise the interview with Annette Marx and Job Roos by the authors, 13 June 2022.

the Irish academic-architects Brophy & Lewis (2011) state in the Preface of their *A Green Vitrivius* handbook that the "ten books on architecture..." are: "…still referred to in every European architect's education", Marx, trained at the TU Eindhoven during the 1980s, recalled only to have learnt about the triad after her studies. She however did note the lessons on the relevance of context, in which 'history' was, at the time, deemed a 'dirty word'.

By contrast, Roos, whose training at TU Delft in the 1970s included also elective courses in conservation, recalled being taught about the triad and considers it an anchor for his architectural thinking today. He stated that the 'delivered buildings' awaiting adaptation for new use are often mishmashes of styles, materials and forms. Therefore, additional aspects deserve attention, such as 'complexity', 'imperfection' and 'time', which enable him to search for hybrid solutions for the problems of adapting the building to new needs.

Marx responded that she applies the triad unconsciously during the iterative design processes and remarked that 'circularity' is also important to her, as is the environment. In her designs, she further seeks to bring human-focused assets into harmony with building focused demands. She sees her interventions as a new layer, which also has to be useful for future additions, to ensure a continuum in time for the building.

Roos emphasised the need of a broad approach based on a deep awareness of time and the sustainability of ideas over a period of 20 to 30 years. When he was tasked in 2008 with the reuse as new home for the Faculty of Architecture of a building completed in 1924 as chemistry lab, he made use of Steward Brand's (1994) *Shearing Layers* model for a critical analysis of the inherent opportunities for adaptive reuse.[40] After the removal of various provisional partition walls to create an internal street, he chose to embrace the laboratory character of the building, leaving the interior 'naked', and to showcase the high quality of the original exterior walls in the interior by enclosing originally outdoor courtyards with glazed façades. These courtyards now form 'squares' to the network of 'streets' (Figure 4).

40. S. Brand, *How Buildings Learn: What Happens after they are Built* (New York: Viking, 1994).

Figure 4. *Delft, Model Hall for Architectural Students in Newly Added Glass Cube, Part of the Adaptation to BK-City as Designed by Job Roos (Braaksma & Roos) and Octacube*
Source: Braaksma & Roos.

Marx applied a similar strategy when adapting a listed school building (dating from 1903) for new use as a higher education institute in Amsterdam for which two courtyards were covered by a glazed shed construction. She aims to '…let the human story (the narrative) speak' and to facilitate the interactivity of the people who use the building.

Roos recalls the awareness of *time*: buildings get a personality, they become part of the city. In his experience, admitting the force of *relativity* creates space for the unexpected during the design process.

Both architects agree that the Vitruvian triad is still useful but they also underline that it must be enlarged for the complex task of 'adaptation' to new needs. This may deal with more types of interventions than 'adaptive re-use' alone, while also intervening for the continuation of the existing use (such as housing, a museum or an office), or *doorbestemming* in Dutch, require skilful design solutions for an updated Utilitas, Firmitas and Venustas in relation to safety, security, routing and reduction of energy consumption et cetera. The *Form Follows Function* assumption provides a much too small base for such a complex assignment of 'integrated design'.

Education Experiences in the TUDelft Heritage & Architecture Design Studios

The Section for Heritage and Architecture (H&A) at the TUDelft focusses on the architectural adaptation of the existing built environment to new (and future)

needs. All design studios take the building, its context and cultural and social values as a point of departure in successive steps. The aim of the 'integrated design' is always to explore and develop coherent and significant re-use or adaptation options of both valourised and unvalourised built inheritance, for instance, the vacant department stores in Dutch historic city centres.[41] Other typologies and built heritage from other periods or foreign countries, have also served for case-studies in the H&A studios. The studios provide important lessons for students in real-life situations with complexity during their field explorations and speak with owners, heritage officials and other stakeholders before they start to work on their design strategies.

The strategy entails close on-site observations, deep investigations into the history and evolution of a building, ensemble or neighbourhood from drawing board to decommissioning, context and relationships, sources of decay and societal needs. The investigation process is marked by three milestones, so-called Chrono-mapping, composing the Heritage Value Matrix and a Transformation Framework.[42] More recently, and aligned with the intention of the 2005 Council of Europe *Convention on the Value of Cultural Heritage for Society* (Faro Convention), investigations also often include in-depth stakeholder engagement.

Chrono-mapping attempts to teach students to understand buildings as being composed of layers, formed over time, very much in the way that Job Roos approaches them, and to present these in timelines, commented sections and plans.[43] The method stimulates to apply more visual representation skills than are usually practiced by specialised building archaeologists in their coloured schemes based on historic plan drawings. The specially developed Heritage Value Matrix is a structured tool to analyse and visualise the attributes that convey value and link these to specific layers in a building on two axes (Figure 5).[44] Buildings are analysed in their status quo using the *Shearing Layers* model of Stewart Brand (1994), augmented by two layers, 'Surrounding/Setting' and 'Spirit of Place' as layers '0' and '8' respectively to include context and intangible values on one axis. These layers can be loaded, or not, with differentiated heritage values on the other axis by means of visualisations (drawings, photos) and/or words. They follow the dialectic values as presented by Alois Riegl in his 1903 essay *Der moderne Denkmalkultus, sein Wesen und seine Entstehung*, augmented by the newly defined 'conflict value' and 'nostalgia value'.[45] The dialectic values set highlights

41. L. Fischer, V. Versluijs, I. Jansen and H. Zijlstra (Eds.), *Spatial Building Typology: Vacant Heritage: Department stores, V&D's* (Delft: Heritage & Architecture TU Delft, 2021).

42. See: N. Clarke, H. Zijlstra, & W. de Jonge, "Education for Adaptive Reuse: The TU Delft Heritage and Architecture Experience," *Docomomo Journal* 61, no. 3 (2019): 70.

43. M. Kuipers, "A Primer of observation" (see M. Kuipers and W. de Jonge, *Designing from heritage: Strategies for conservation and conversion* (Delft: TU Delft, 2017), 31-64).

44. Developed by Clarke & Kuipers, with input from Hielkje Zijlstra and Sara Stroux (see N. Clarke, and M. Kuipers, "Introducing the Heritage Value Matrix: Connecting Matter and Meaning in Built Heritage," in *Proceedings IMaTTe2017- Intangibility Matters - International Conference on the Values of Tangible Heritage* (Eds.) M. Menezes, D. Costa and J, Rodrigues (Lisboa: LNEC, 2017), 207-216.

45. M. Halbertsma and M. Kuipers, *Het erfgoeduniversum: Een inleiding in de theorie en praktijk van cultureel erfgoed* (Bussum: Coutinho, 2014), 55-76.

the inherent conflicts between commemorative (heritage) values and contemporary 'use values' in adaptation that lie at the heart of any re-use project.[46]

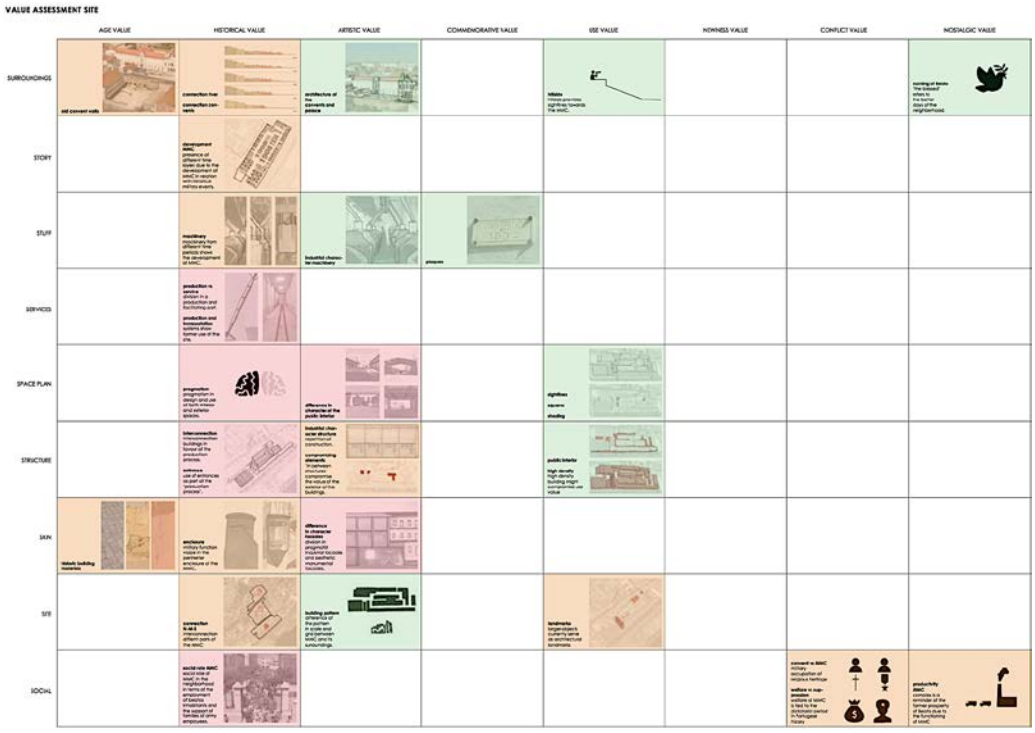

Figure 5. *The Heritage Value Matrix Applied on the Multi-Layered Military Maintenance Complex in Lisbon, Differentiated According to Relevance along Building Layer, Value and Theme*
Source: Sophie Lok, Heritage & Architecture master student, TUDelft, 2016.

From the clear understanding of these two steps, a framework for transformation can be developed that outlines opportunities, obligations and, importantly, dilemmas for the architectural student engaged in design for adaptation. Although each student is obliged to make his or her individual design in a later phase, the studio process purposefully also includes (sub) group presentations and discussions about findings, interpretations, dilemmas and possible design directions. Experience of the H&A education has shown that such interactive exchanges are as instructive and informative as the individual investigations.

The H&A education at the TUDelft is elective and only a portion of graduates in the architecture track of the faculty will be taught these importation skills with which to deal with the existing built environment. This makes it even more pressing to ensure that a broad appreciation of all extant buildings (not just the designated monuments) is included in the heuristic forming of all architects.

46. N. Clarke, M. Kuipers, and S. Stroux, "Embedding built heritage values in architectural design education," *International Journal of Technology and Design Education* 30, no. 5 (2020): 867-883.

Expanding the Vitruvian Triad: Adding *Dignita*s as Fourth Virtue

Taking up Deben's appeal to think differently, we must rethink both architectural theory, education and conservation and look for opportunities to bridge the identified divide between radical new-build or re-architecture on the one side, and the conservation of historic forms and substance on the other. Just as the conservation doctrines call on conservationists, to take an ethical position towards respecting the authenticity of heritage, so an ethical position is required to respect the inherent qualities of the already existing built environment for architectural design principles. Architects have a wider responsibility than producing designs for single- and often short term uses for new-build.[47] The same applies for their clients.

In view of the current *Renovation Challenge* it has become inevitable to turn the focus from entirely new-build to thoughtful adaptation of the extant building(s), while keeping also future life-cycles in mind. The noted urgency to start a 'forward-looking process to match sustainability with style' implies much more than merely aiming at reduction of energy consumption or focusing on aesthetics. It means a fundamental shift of paradigms in relation to architectural design, material and cultural resources. As a consequence, the idea of 'reversibility', stemming from the conservation theory and the 1983 ICOMOS *Appleton Charter for the Protection and Enhancement of the Built Environment*, may be as critically interrogated as the promise of new-build to solve the problems of an unhealthy habitat.[48] Our environment can no longer be treated as a blank canvas but has to be approached as a *tabula plena* where careful adaptation is the norm for architects and builders. Revising general architectural education is essential. Buildings are to be considered metaphorically as living organisms that deserve careful treatment. To enable and stimulate such a sensitive approach a broad accessible portmanteau must be introduced in architectural thinking; a single but fluid term that allows for wide interpretation on the base of responsibility and respect.

In noticing that the three virtues of the Vitruvian triad are still widely disseminated in architectural theory and practice, we conclude that this must be augmented with a fourth virtue – one that is of a similar importance as *Firmitas*, *Utilitas* and *Venustas* and can be related to both material and immaterial qualities and the dimension of time. This virtue must immediately trigger relevant decisionmakers to investigate the polyvalent qualities of the extant buildings and sites in a systematic way of observation and valuation prior to the process of (re-)design for adaptation to new needs.[49] In searching for an appealing concept that touches upon aspects of value, integrity and esteem in the built environment,

47. W. Röling, *De kunst van de ingenieur & De verantwoordelijkheid van de architect, met daartussen Een gezicht op Delft* (Amsterdam: Amsterdam University Press Salomé, 2002).

48. W. J. Quist, "Kernbegrippen in de restauratie," in *Culturele draagkracht: Op zoek naar de tolerantie voor verandering bij gebouwd erfgoed* (eds.) M. C. Kuipers and W. J. Quist (Delft: Delftdigitalpress, 2013), 25.

49. M. C. Kuipers, "A primer of Observation," in *Designing from heritage: Strategies for conservation and conversion* (eds.) M. Kuipers and W. de Jonge (Delft: TU Delft, 2017), 31-64.

and that can be applied in our 21st century society, we consider *Dignitas* (dignity) most appropriate to term the fourth virtue; to be more precise: the inherent dignity of an inherited place, building, ensemble, neighbourhood or landscape.[50] The term *Dignitas*–inherently linked to worthiness, reputation and respect–is wilfully open to multiple interpretations, yet it immediately implies distinction and it forces relevant stakeholders, including architects, to take an ethical position towards the treatment of the built heritage/environment, whether this is listed or not. The concept may be adopted as an umbrella for a wider range of values that deserve acknowledgement when decisions must be made about the future of the extant buildings than usually applied to heritage, architecture and environmental norms. It is meant to aid the design process and the dialogue about the necessary interventions for adaptation.

We are not the first to wish to augment the Vitruvian triad. In *A Green Vitruvius*, Vivienne Brophy and J Owen Lewis (2011) propose the addition of a fourth virtue: "...restituitas or restitution, restoration, reinstatement: where the act of building enhances its immediate and the global environment in an ecological, as well as visual sense."[51] But this also fails to acknowledge that a building could contain and present a range of values, what Christopher Alexander refers to as the 'quality without a name' beyond those of firmness, use and beauty.[52]

We are likewise not the first to relate the term *Dignitas* to architecture or built heritage. Even Vitruvius himself and his reviver Leon Battista Alberti spoke of dignity in their respective treatises on architecture, both in relation to (noble) men and respectable buildings. Art critic John Ruskin made extensive reference to the dignity of historic buildings; for instance, in his *Seven Lamps of Architecture*, as an essential value to respect.[53] His implicit emphasis on the value of material authenticity became central in the 1931 Athens Charter, and is recast in the 1964 Venice Charter for the Conservation and Restoration of Monuments and Sites, but we like to stress that the concept of 'dignity' can be used in a much broader sense and also in the context of adaptation.

In contemporary discourse the term 'dignity' often pops up in relation to human beings, especially those who need assistance and care. The parallel between people and buildings to be carefully treated is perhaps no coincidence, it may even underline the dynamic relationship between human beings and their built environment, which is our habitat, and therefore calls for care. A sincere acknowledgement of a building's *Dignitas* places the building *before* the ambitions of the current owner or architect, extending the timeframes being considered from that of immediate need to long-term maintenance and curation through use. When we told Marx and Roos of our proposal to add the virtue of *Dignitas* to the Vitruvian triad, they responded enthusiastically and indicated their willingness to

50. For all clarity, the proposed augmentation of the triad with 'Dignitas' is based on present day insights and not a direct application of the term as used in the ancient Roman mindset of authors like Cicero in that historic context for the prestige of male citizens of an acquired standing.

51. V. Brophy, and J Owen Lewis, *A Green Vitruvius: Principles and Practice of Sustainable Architectural Design* (Boca Raton, FL: Routledge, 2012), *Foreword*.

52. C. Alexander, *The timeless way of building* (New York: Oxford Univ. Press, 1980), 9.

53. J. Ruskin, *The seven lamps of architecture* (Orpington: Allen, 1890), passim.

further explore its potential in their professional practice and architectural teachings on 'integrated design' which is based on thoughtful analysis of the existing buildings and their opportunities for continuity by means of well-considered and respectful interventions. Yet it is important that also other educators will adopt the virtue of *Dignitas* and assess the merit of our proposal.

Interestingly, the presence of *dignity* in a humble building of stone as inspiration for new-build is noted in an essay about massiveness, but it gives no thoughts to the safeguarding of this source.[54] The dignity of an extant construction can lie in its visible traces of ageing, such as patina and cracks, but also in other qualities, both tangible and intangible, including simply its 'being'. It is up to the curator-architect to investigate what the existing structures can offer for new, other or additional uses of the available spaces, while respecting the Dignitas in their integrated design strategies.

While searching for an appropriate visualisation of the equity of the, now *four* virtues, which give sufficient importance of *Dignitas*, we first elaborated on the form of a prism but then found the Greek cross a more appropriate basic form to demonstrate the interrelations and from there it is an obvious step to transform this into a compass, with Dignitas as the indicator for the northern direction (Figure 6). The analogy supports also the moral appeal to adopt an ethical attitude towards the built environment and the decreasing availability of space, construction materials and energy.

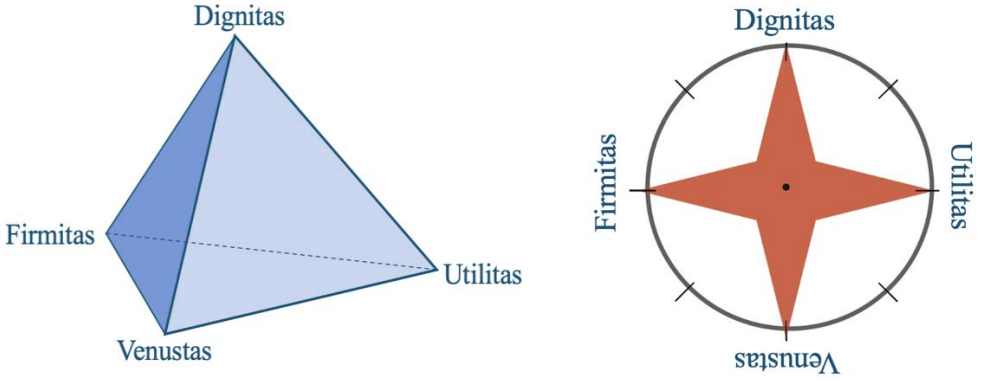

Figure 6. *(Left) The Expanded Vitruvian Virtues Represented as a Pyramid with Dignitas on Top; (Right) The Expanded Vitruvian Virtues Represented as a Compass with Dignitas as the Marker for Taking Position*
Source: Nicholas Clarke and Marieke Kuipers, 2022.

Alongside this environmental imperative, the cultural imperative of adaptive reuse or *doorbestemming* calls for a thorough investigation of the 'cultural carrying capacity' of extant buildings, neighbourhoods and sites and their tolerance for change. Age-old church buildings, for instance, cannot in all parts be adapted for secular reuses in the same way as abandoned industrial buildings, due to the

54. M. Tschanz, "Of heavy mass and apparent heaviness," in *Constructing architecture: Materials, processes, structures: a handbook* (ed.) A. Deplazes (Basel: Birkhäuser, 2018), 255.

inherent sacredness that the churches held.[55] Both conservationists, architects and other stakeholders must learn to deal with the 'challenge of change' and to find a common vocabulary for discussion about the 'do's and 'don'ts'.[56] In the end, respecting *Dignitas* in adaptive designs means that all Vitruvian virtues must be matched. This may lead to a broader interpretation of the idea of 'compatibility' than mainly historically, materially or functionally. What matters is the will to adapt extant buildings carefully for a new life cycle of some 20 to 30 years by means of sensitive adaptations, balancing between minimal and maximal interventions. Every time a critical assessment must be made of the tangible and intangible values that are embodied in the inherited 'stones' and 'stories' of the buildings (designated monuments or not) and what must be continued as much as possible.

Remarkably, the Dutch Cultural Heritage Agency proves essentially open to such adaptations to statutory protected monuments, stating that the intended "interventions must relate to the typology and characteristics of the monument in an appropriate manner" and that "they sufficiently support the value of the monument" and that they "through their design quality, can add a new, meaningful layer of time" to the monument.[57] The prerequisite is that every intervention is based on "…knowledge of the monument and its monumental value, of its history of construction and use, of its spatial context and meaning; in short, of the story of the monument and the place."[58] This brings us back to the need of a fundamental reconceptualization of the architectural education and praxis in which the extant building stock and its inherent qualities will be central: *education permanente* for heritage *and* architecture.

Conclusion

The main conclusion of our mixed research is not surprising. The Vitruvian triad is still useful for architectural thinking but it should be expanded by a fourth virtue of equal importance to *Firmitas*, *Utilitas* and *Venustas* to shift the focus from designing for new-build to adaptation of the existing. In analogy with the desirable respect for human beings the term *Dignitas* is introduced to advance a respectful attitude towards the extant buildings, the habitats and the planet in general. It is remarkable that several prolific architects who have demonstrated a great affinity with the ideals and aesthetics of the Modern Movement in their work now conclude that the reduced maxim *Form Follows Function*, as proclaimed by the functionalists, is not fit for the great Renovation Challenge of today. They

55. M. Kuipers, "Saxa loquuntur? Spankracht en draagkracht van eeuwenoude stadskerken," *Bulletin KNOB* no. 110 (2011): 174-182.

56. M. C. Kuipers, and W. J. Quist (Eds.), *Culturele draagkracht: Op zoek naar de tolerantie voor verandering bij gebouwd erfgoed* (Delft: Delftdigitalpress, 2013); N. J. Clarke, *How Heritage Learns: Dutch Public Housing Heritage Evolution in Ecosystemic Perspective* (Delft: TUDelft, 2021).

57. Rijksdienst voor het Cultureel Erfgoed, *Uitgangspunten en overwegingen advisering gebouwde en groene rijksmonumenten* (Amersfoort: Rijksdienst voor het Cultureel Erfgoed, 2019).

58. Ibid, 5.

publicly underline the necessity for architects to take their responsibility and to take care of the existing by thoughtful interventions.

The divide between the two Charters of Athens must and can be bridged if the architectural thinking will include the concept of *Dignitas* and the world will be seen as *tabula plena*. Rather than to focus on the–material and/or form-focused–conservation of historic buildings and sites it is vital to enhance the continuity of the built inheritance by means of adaptation, just like other creatures do in the natural environment. The expanded Vitruvian triad, actually the architectural compass based on four interplaying virtues, has great potential for advancing a new responsive attitude towards the built environment, close to current trends like 'upcycling' and adaptive reuse, not only in education but also in the ongoing dialogue between all kinds of stakeholders involved in the interaction with extant buildings. Additional research and tests may be required to enhance the adoption and applicability of *Dignitas* as the fourth virtue in education, but first this concept must be communicated and discussed in a wider audience of interested architects and conservationists.

We contend that the timely acknowledgement of *Dignitas* is vital to (re)unite the Vitruvian and Functionalist modes with that of careful custodianship of the existing. It is the starting point for a critical analysis of the cultural resilience embedded in the dynamic interaction between the 'Stories' and the 'Stones' and for justifying new interventions. By expanding the Vitruvian triad with *Dignitas* as fourth virtue, the cultural imperative of architectural conservation and the environmental imperative of maintenance can be foundationally grounded. In so doing both these challenges, which go to the core of current and future challenges, can be better addressed, guiding the increasingly complicated balancing act between change and continuity.

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Athens Journal of Architecture - Volume 9, Issue 3, July 2023 – Pages 281-298
(received: 6 July 2022, received in revised form: 18 February 2023, accepted: 4 April 2023)

Identity of Architecture: The Case of the National Library of Kosovo

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This article is part of a research on concepts that belong to theoretical speculation sin the discipline of architecture. The main intention is to shed light on the relationship of these theoretical concepts with the construction of architectural form and the episteme of architecture itself. One such concept is the identity of architecture. In this context, this research aims to clarify the interplay between identity – as a theoretical concept that is directly related to the form – and the architectural discipline. The first hypothesis is that architectural forms do not have a particular identity detached from their formal essence, but have an identity expressed by morphology. Second, different architectures, being forms of representations, express an external identity depended on the historical, political, social or cultural conditions. This article defines three main plans through which the identity of an architectural work is manifested: formal, stylistic/linguistic, and technological. The followed methodological approach is based on a theoretical analysis of the concept of identity, its contextualization within the discipline of architecture, and the interpretation of the results of such analysis through the case study of the National Library of Kosovo, built in Prishtina during 1971-1982. The study of the National Library is conceived as an example where the results obtained at a theoretical level and which aim to further clarify the discourse on the presented concepts, are expected to be verified.

Introduction

Architecture is a field of representation of society and its material existence, which depends on the context, users and historical conditions. As such it is commonly related to the concept of *identity*, be it national, religious, cultural, or other. In this context, the fundamental premise of the research is that an architectural work expresses a certain external identity, while at the same time has its own identity. Therefore, the objectives of this paper are: 1) to decipher the identity of architecture by unfolding the plans in which it appears; 2) to understand how an architectural work is used to represent the identity of the state and society. The first objective is addressed through the introduction of three plans which define the identity of architecture using its own features. These are the formal plan, the stylistic/linguistic plan and the technological plan. Here, we are to deal with aspects of a building such as typology, geometry, proportions, aesthetics, and the technology and materials used for its construction. The second objective is related to wider political, economic, cultural, and social conditions and events,

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which are represented through architecture and determine how the individual is identified with a work of architecture.

The presented research is part of the studies within the field of architectural theory, focusing on the period of modernism. The methodological design is based on a mix of research methods, including literature review, textual analysis, case-study research, and morphological-typological and aesthetical analysis of a building. In this way it is developed a theoretical discussion related to the meaning of *identity* and its emergence on the architectural discipline, through the discussion and interpretation of concepts presented by authors such as Manfredo Tafuri,[1] Franco Purini,[2] Carlos Martì Arìs[3] or Raimundo Panikkar.[4] The results of this discussion which constructs the theoretical framework, are interpreted and tested through the case study, the National Library of Kosovo, built in the capital city of Prishtina during 1971-1982 (at the time when Kosovo was an Autonomous Socialist Province of the Socialist Federal Republic of Yugoslavia).

On one hand, the study of this specific building is precisely developed in the context of form, style/language and technology, in order to decipher its own *architectural identity*. On the other hand – by analyzing the ideological, political, economic, cultural and social context in Prishtina, Kosovo, and former Yugoslavia – the building will be used to understand how architecture is utilized as a *symbol of identity* (i.e., having the function of an identifying representation, being so inherent to the individual's experience and memory). By introducing and defining the aspects through which the identity in the architectural practice is studied, this research contributes to the emergence of new tools for interpreting architectural works, and the relating of the theoretical dimension of the discipline of architecture, to a concrete and practical level.

Identity in Architecture

When discussing about *identity* in the discipline of architecture, it has to be emphasized that the term has two meanings, referring both to the internal features of a building and to the external conditions that the building identifies, i.e., *identities* that it represents. Referring to Raimundo Panikkar – although the author's analysis extends to the religious dimension – one can understand that the difference between these two meanings lies on the fact that the first has an objective and material character, while the second is based on interpretation and is a subjective process within which different relations occur.[5] Based on this, identity appears as an internal quality of the object, independent of the observing subject.

1. M. Tafuri, *Architecture and Utopia: Design and Capitalist Development* (Cambridge Massachusetts and London: MIT Press, 1976).

2. F. Purini, *Të Kompozosh Arkitekturën* (Tirana: Polis Press, 2019).

3. C. Martì Arìs, *Las Variaciones de la identidad: ensayo sobre el tipo en arquitectura* (Barcelona: Serbal, 1993).

4. R. Panikkar, *Christophany: The Fullness of Man* (New York: Maryknoll Orbis Books, 2004).

5. Ibid, 154.

This does not imply that the object is detached from the context (e.g., site condition, social relations, etc.), but rather it has a particular relation with the context, which occurs at an individual level and experience, regardless the qualities of the object.

In order to extend the above distinction from a theological plan to the discipline of architecture, it can be considered that the internal identity of architecture is expressed through its material aspects. First, it is listed the geometry of an architectural work and the report or relation between specific parts inside the whole building, which are used to give form to the building. Secondly, it can be listed how this geometry is manifested in the stylistic and linguistic plan. And the third is listed the technology through which the building is constructed. Differently put, within the identity of architecture are included all the aspects that affect the materiality of the building, and are expressed through the physical and tangible dimension.

Through all the features listed above, an architectural work is then used to identify something other than itself. For instance, the emerging American nation in the eighteenth century, gave concrete form to its representative democracy through the use of neoclassical architecture and Baroque forms of city planning, utilized in L'Enfant plan for Washington, D.C.[6] A specific morphology and a specific architectural language were adapted to address the politico-ideological programme of the United States' government, which would constitute the identity of the American nation.

The identification with an architectural work is also an individual or collective interpretation of a certain building, neighborhood, or city, based on experience. But, the building, neighborhood, or the city, exist with their formal and aesthetic identity, regardless of the interpretation or identifications that a particular individual or social group has or not with them. This is confirmed by Manfredo Tafuri, who referring to Georg Simmel, writes on the *blasé* attitude of the *Baudelarireian flâneur*, to show that one can experience the architectural and urban form independently of the form itself[7]. In this line, according to Franco Purini, there is a kind of *distracted perception*, which characterizes personal experiences of the city space.[8] In this case, architecture is not an element that one can search for it in the city – as a work of art, a concert or a book may be – but it appears randomly to the observer.[9] These references show that the individual's approach to architecture can be passive, and that the internal independent identity of the building exists even without being recognized by him/her; just as a building with its identity can exist on the other side of the world, but one does not identify it or is not being identified with it.

To undestand the identity of architecture, which is then related to the presentation of particular external identities, it is important to define each of the plans introduced at the beginning. The first plan, which has to do with the formal identity, is closely related to the geometry of a building and the elements that

6. Tafuri, *Architecture and Utopia: Design and Capitalist Development*, 1976.
7. Ibid, 78-86.
8. Purini, *Të Kompozosh Arkitekturën*, 2019, 53.
9. Ibid, 54.

constitute it. This identity is expressed in formal and typological terms and includes, starting from the first archetypes, all the formal types that the individual has created in the long process of construction. Taking into consideration the definition that Martì Arìs makes regarding the three universal categories of architecture[10]– constructed on Karl Popper's epistemological principles of the *Objective Knowledge* and the division of "three worlds" – it can be defined what is meant with *formal identity.* Arìs has already distinguished the three universal categories of architecture in building elements or parts, formal relationships between these elements or parts, and architectural types.[11]

Based on what is stated above, the formal identity unfolds in these three overlapping *layers*. First, it relates to the elements of a building and its shapes. These elements can have different geometries that determine their identity. For instance, a vertical element (the column) can be circular or square in base. This layer implies the geometric relation of the filled parts of the building such as columns and walls, but can also be applied to the geometry and the shape of empty parts, of openings such as doors and windows. The second layer refers to the relationship and proportions that these elements create with each other. This is expressed by what Vitruvius describes as *eurythmia* and *symethria,* re-interpreted as the concept of *concinnitas* by Alberti. This layer deals with the proportions of a single element and the proportions formed between the various elements that constitute a building. The third layer of the formal identity of a building is formed by the typology and geometry, dependent on the way in which the elements are placed and the formal type that they create.

Elements of a certain building can have different geometries and shapes, and this expresses the layer of the formal plan. The same elements may have a different geometric ratio, defining – based on these relationships – different morphology, expressing in this way the second layer of the formal plan. The same elements can be distributed and placed according to a linear, circular, or mixed typology, thus, constituting the third layer of the formal plan.

The second plan for the definition of the identity of architecture is the stylistic/linguistic one. From the geometric/formal point of view, there are many examples of the same typology that is expressed in different languages or architectural styles. The cases are numerous, but we can mention architectural works belonging to the same formal typology, for example, the Villa Capra by Palladio, La Rotonde by Ledoux, Altes Museum by Schinkel, the Stockholm Library by Asplund, the Capitol of Chandigarh by Le Corbusier, the Gallery of Stuttgart by James Stirling or even Mario Botta's Rovereto Museum. All these cases, although they have the same formal structure, are distinguished for their stylistic or linguistic expression.

To clarify further, if Saint Peter's Basilica is compared to the Taj Mahal in terms of typology, according to the Vitruvian *iconographic* level, there are similarities expressed in the type of *enclosure* with an inscribed circle. The similarities are not only on the functional side, as both buildings are places that

10. Martì Arìs, *Las Variaciones de la identidad: ensayo sobre el tipo en arquitectura*, 1993, 33.
11. Ibid.

celebrate memory, but above all at the level of formal typology. The only difference between these two artistic masterpieces lies in the language that is used. Saint Peter with a language that celebrates the memory of the Christian apostle and religious histories through metaphors that have in the center the image of man, and the Taj Mahal which due to religious influences maintains an idiosyncratic attitude towards real images by being decorated with geometric motifs.

The last plan that determines the identity of a building is related to the technology and materials used for its construction, which can be from the most ancient to the most modern, from the most natural to the most artificial, and which can vary depending on the context. The choice of technology and materials is always in the function of the stylistic/linguistic plan, while both of these aspects interact to construct the formal identity which appears almost independent of them.

Finally, we can add that in the formal plan, architecture has a universal, almost cosmic dimension. There are no major differences between the forms of architecture constructed in different places. Even if we find any difference, it would still be minimal and not significant. The most obvious distinction exists between the stylistic/linguistic plan and the technological aspect. In this context, on iconographic level, the National Library of Kosovo, whose analysis will be developed based on the three defined plans, can also be considered as an *enclosure* with an inscribed circle, similar to all the monuments mentioned above. The differences with other architectural works are represented through the architectural languages and stylistic references.

Setting the Context: The National Library of Kosovo

The National Library of Kosovo, built in the capital city of Prishtina – between 1971 and 1982, was designed by the Croatian architect Andrija Mutnjaković. Its construction is part of the city's general urban transformation which starts after the end of the Second World War (1945) and continues until the late 1980s, a period during which Kosovo was an Autonomous Socialist Province within the Socialist Federal Republic of Yugoslavia. For the city of Prishtina – which until the end of the Second World War was an underdeveloped urban center with distinguished oriental morphological and stylistic features – the period after 1945 has been determinant for important political, economic, social, and cultural events, in both local and federative level, which were initially manifested in urban planning and architecture.[12] In this context, it is necessary to explain the social conditions in Prishtina and former Yugoslavia in relation to architectural achievements, to understand the identity of the National Library, particularly in stylistic/linguistic and technological aspects, and to decipher what the architecture of the building identifies and on what terms the citizens of Prishtina are identified with it.

12. A. Sadiki, "Reflections of Sociopolitical Developments in the Architecture of Prishtina During 1945-1990", in *Prishtina New European Capital: Images of a City to be Discovered* (eds.) L. Rossi, B. Aliaj et al. (Tirana: POLIS Press, 2019), 18.

In socialist Yugoslavia, modernist architecture and urbanism were critical in the construction of socialism, being means for differentiating new typologies from the capitalist form of urbanization, aiming at the *de-Ottomanization* of the urban space.[13] The socialist Yugoslav city was the field where political power intended to express the social progress by destroying the former – capitalist/bourgeoisie system, spatially represented by Ottoman buildings and public spaces.[14] The dominant ideology of the period was that of "Brotherhood and Unity", a 'homogeneous Yugoslavism' built on the idea of social unification, and political and economic centralization. It aimed to transcend all forms of ethnic, religious, or regional identity to develop a "Yugoslav identity".[15]

Starting from the late 1960s, development in architecture and urbanism occurred simultaneously with wider social, political, economic, cultural, and constitutional changes, which somehow allowed the fostering of a sense of identification of each entity within Yugoslavia, leading to the idea of 'national identity', which then would contribute to the general image of the former federate. After 1966, the ideology of "homogenous Yugoslavsim" started to vanish, opening way for greater national development, including twenty years of general development for Kosovo.[16] In this context, between the late 1960s and late 1980s, Prishtina experienced the most significant urban and architectural transformations.

This period is characterized by a considerable number of construction-reconstruction activities, defined by a modernist architectural discourse and an ideological background based on the concept of *identity*. The dominant typology of the period was landmark architecture. Architectural works were constructed almost spatially autonomous from each other, but have a strong character of space formation,[17] in unbuilt and undeveloped urban areas, by creating new centralities in the city and forming separate urban fragments.

Examples of this phenomenon are the National Library of Kosovo, the Palace of Youth and Sports, Rilindja Publishing House, the former Ljubljanska Bank, and other public buildings considered important for the statehood of Kosovo. From this group, the National Library of Kosovo (Figure 1) is probably the most distinguished case. Constructed at the very center of the University of Prishtina Complex, the National Library is defined by Kosovo Albanian architect and professor Teuta Jashari Kajtazi in her doctoral thesis, as *the first, leading, and strongest interpretation of the period.*[18] Analyzing her interpretation of the

13. F. Jerliu, and V. Navakzi, "The Socialist Modernization of Prishtina: Interrogating Types of Urban and Architectural Contributions to the City," *Mesto a Dejiny* 7 (2018): 66-74.

14. I. Gjinolli, "From Ottoman to Modern – Transformation of Prishtina 1945-1990," in *Prishtina New European Capital. Images of a City to be Discovered* (eds.) L. Rossi, B. Aliaj, et al. (Tirana: Polis Press, 2019), 50-63.

15. T. Kajtazi, *Behind the National Identity: Politics and Social Activity Through Architecture – Liberal Socialism in Kosovo* (Wien: TU Wien, 2016).

16. Ibid.

17. D. Papa, "Envisioning the Future of Prishtina: An Image Shaped by the Spatial Experience," in *Prishtina New European Capital. Images of a City to be Discovered* (eds.) L. Rossi, B. Aliaj, et al. (Tirana: Polis Press, 2019), 34-41.

18. Kajtazi, *Behind the National Identity: Politics and Social Activity Through Architecture – Liberal Socialism in Kosovo*, 2016, 92.

building, one can understand that the Library is one of the few landmarks in Prishtina which maintained its form and function until today, as it has managed to retain its original character and resist all the changes Kosovo underwent since the

1970.[19]

Figure 1. *Left*: *The National Library of Kosovo, Areal View*; *Right*: *The National Library of Kosovo, View from the Entrance*
Source: https://architectuul.com/architecture/national-library-in-prishtina.

Identity of Architecture in the Case of the National Library of Kosovo

A proper analysis of the architecture of the National Library of Kosovo is related to what the building represents in terms of the ideological and urban-architectural context in Prishtina (and Former Yugoslavia) and to the division of architectural identity in the formal, stylistic/linguistic, and technological plan. Critical to understand and distinguish in this case, are two contexts. The first is the identity of the architecture of the Library, and the second is the identification with the architecture of the Library.

Formal Plan

The initial formal parameters of the National Library were determined with the master plan for the University of Prishtina Center, which was drafted in 1971 by the Urbanism and Design Institute in Prishtina (Figure 2). The project was led by Kosovo Albanian architect Bashkim Fehmiu, in consultation with the architect from Belgrade, Bogdan Bogdanović, both being regular CIAM delegates. Although the master plan is categorized as an urban project, it contains the fundamental principles to shape the space from the architectural point of view,[20] in the sense of form and function. The general framework of the design is considered to be the construction module with a cubical structure covered with a dome. These principles are followed in the project for the National Library, designed by the Croatian architect Andrija Mutnjaković. Practically, what Mutnjaković was doing with the combination of cubes and domes in architectural work, Fehmiu did in

19. Ibid.
20. Sadiki, *Arkitektura e Ndërtesave Publike në Prishtinë* (Prishtina: Blendi, 2020), 122.

urbanism with spaces and domes. The architect of the Library worked on a similar proposal for the competition for the Sarajevo library in Bosnia and Herzegovina, characterized by cubes and domes, yet different in size, shape, functional organization, and spatial layout.[21] The project was not selected to be constructed but raised a discussion among professionals. Fehmiu saw the project and believed that it would fit his plan for the University Centre, to which Mutnjaković referred as "a city, a small city in the center of Prishtina".[22]

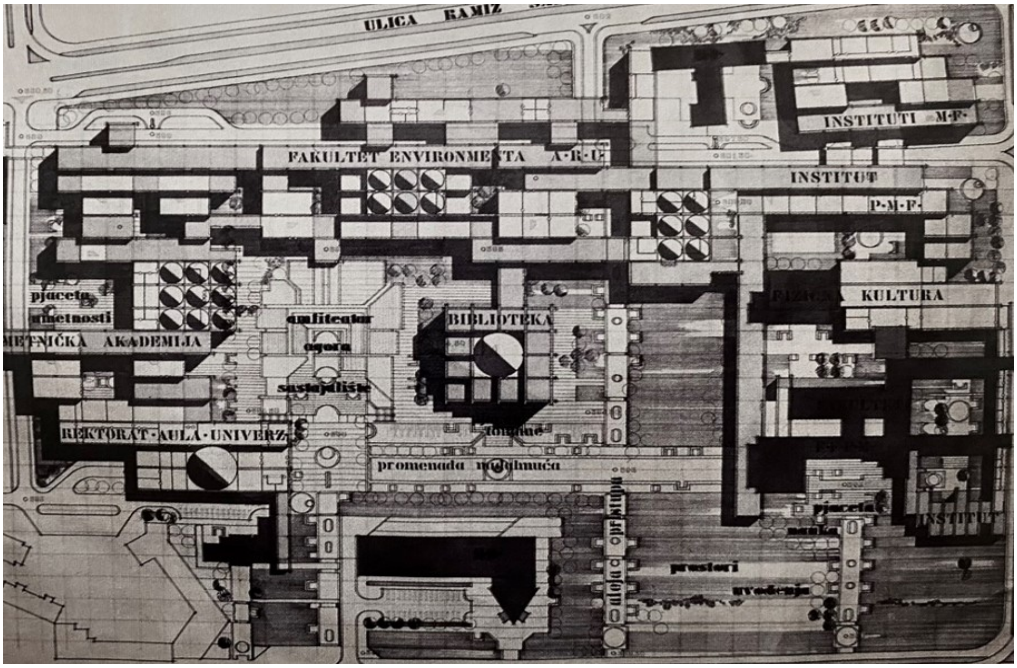


Figure 2. *The University of Prishtina Center, Ground Plan*
Source: Sadiki, 2020.

The formal layout of the Library, which is based on a proportional system combining the grid with concentric circles, is entirely inserted within a quadrant whose diagonals equal the diameter of the circle (Figure 3). In terms of geometry and form, the building is an example of the typology represented by an inscribed circle, similar to Saint Peter's Basilica or the Taj Mahal. The seven-story building with 12000 square meters of usable space is characterized by two compositional elements: the cube and the dome (Figures 4 and 5). These two elements create the form of the building, representing layers of Islamic and Byzantine architecture, to be found in Kosovo and the region.[23] The combination of cube and dome in the architecture of the National Library, as two dominant and multiplied morphological elements, also recalls the typology of famous works of modern architecture, such

21. Kosovo Architecture Foundation, and Getty Foundation, *Conservation and Management Plan. The National Library of Kosovo "Pjetër Bogdani"* (Prishtina: National Library Press, 2017), 30.

22. Ibid, 31.

23. I. Ivas, "Interview with Andrija Mutnjaković," in *Kosovo Modern: An Architectural Primer* (eds.) I. Gjinolli, and L. Kabashi (Prishtina: National Gallery of Kosovo, 2015), 136-147.

as the Amsterdam Orphanage designed by the Dutch architect Aldo van Eyck in 1960 (Figure 6).

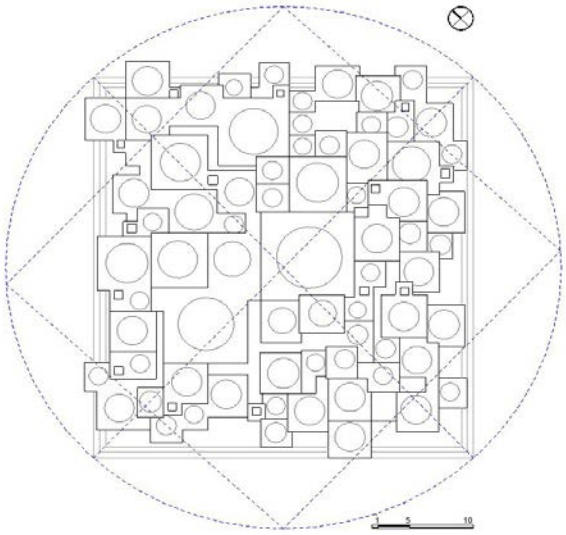


Figure 3. *The National Library of Kosovo, Formal Layout*
Source: © Dasara Pula.

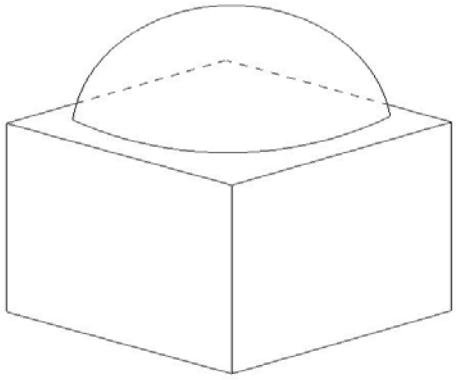


Figure 4. *The Combination of Cube and Dome*
Source: © Dasara Pula.

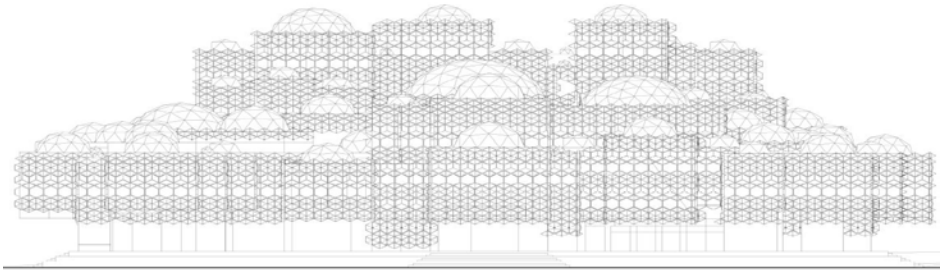


Figure 5. *The National Library of Kosovo, Western Façade*
Source: © Dasara Pula.

In his interpretation of the architecture of the Library, its architect Andrija Mutnjaković introduces the term *structural*. This term is particularly referred to as

the strategy of planning the repetitions and mutations of the elementary spatial module.[24] The entire unique complex contains several cubicles, each topped with small white domes which are 99 in total, while a larger dome covers the center.[25] The dome construction answered the demands of the reader, in this way space is rounded and the lighting is close to the reader.[26]

The spatial type is selected between the type of libraries perceived as spacious halls, such as in Belgrade and Zagreb, and the type of simultaneously common and spatially separate volumes, as is the case with the library in Berlin. In this case, Mutnjaković gave advantage to the second spatial type.[27] The spatial arrangement of the library is done according to the scheme of treating the central area as an atrium with the function of a basic communicational area. Reading areas and other units are situated on different floors. They are distributed according to their importance, functional unity, and the number of visitors.[28]

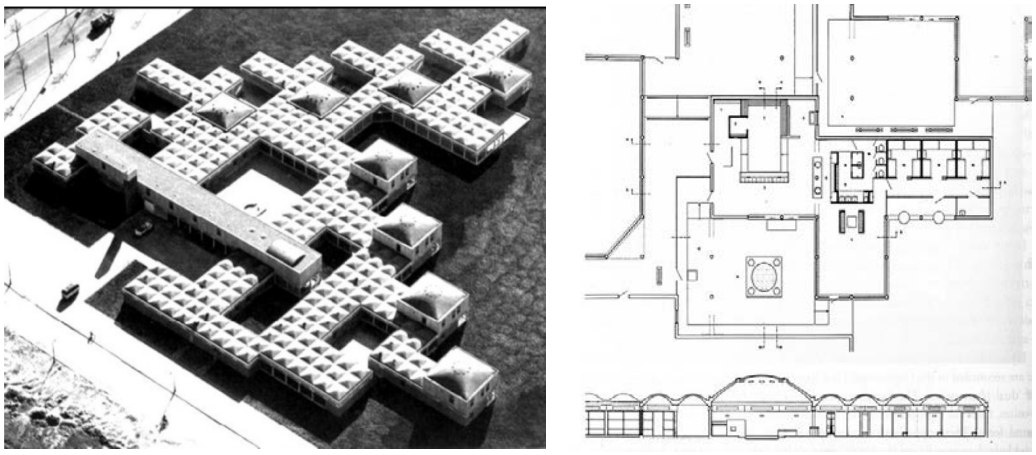


Figure 6. *The Amsterdam Orphanage by Aldo van Eyck*
Source: https://www.archdaily.com/151566/ad-classics-amsterdam-orphanage-aldo-vaneyck?ad_medium=gallery.

Stylistic-Linguistic Plan

In principle, a cube covered with a dome is a morphological-typological feature present in different stylistic periods and architectural languages. Yet, there is a third compositional element in the architecture of the National Library, which is a detail that makes it a modernist work in terms of style. This element is the metallic grid made of hexagonal shapes, which has the function of a curtain covering the façade, while hexagons are also repeated on the dome structure (Figure 7). To make a comparison with other modern architectural works, we can

24. A. Mutnjaković, "Architectonics Summary," in *Narodna i Univerzitetska Biblioteka Kosova* (Prishtina: Rilindja, 1984), 134.

25. Kajtazi, *Behind the National Identity: Politics and Social Activity through Architecture – Liberal Socialism in Kosovo*, 2016, 92.

26. Ibid, 105.

27. Mutnjaković, "Architectonics Summary," 1984.

28. Ibid.

emphasize that the hexagonal grid was also a compositional element used by Frank Lloyd Wright as a stylistic feature in the planimetry of Hannah House.

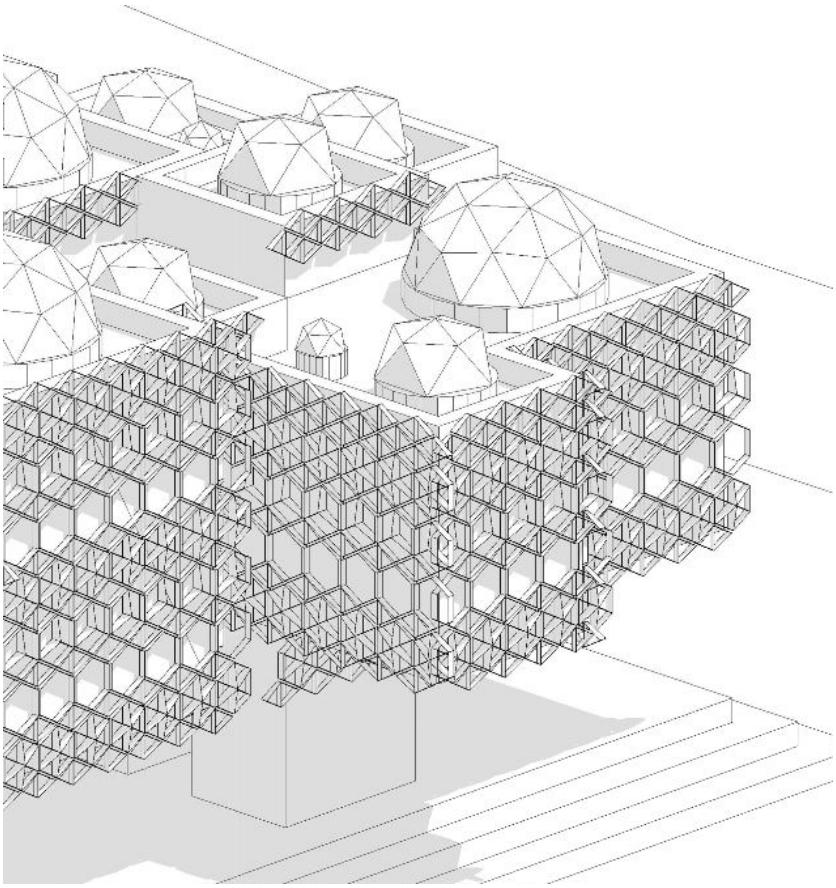


Figure 7. *The National Library of Kosovo, Cube, Dome & Grid*
Source: © Dasara Pula.

The metallic grid on the façade has the intention to control the solar light, namely serving as the "internal illumination of space".[29] The grid gives the impression that construction elements have been left on the site, therefore the exterior of the building has always conveyed a somehow unfinished look. This architectural style was developed in Western Europe a few years earlier and an example is the George Pompidou Centre in Paris.[30] If we exclude the grid from the façade, the building would be a good example of brutalist architecture (Figure 8).

ty through Architecture –

Figure 8. *The National Library of Kosovo, View of the Building without the Grid*
Source: © Kosovo Architecture Foundation.

The modern project of the Library originates in the period when the modern heritage in the region was critically reviewed. Mutnjaković expresses his criticism of high modernism and recognizes the international and local origins of the regional approach within the modern movement.[31] Through the project for the National Library in Prishtina, he finds a spatial archetype and tries to affirm the vitality of the regional architecture. The "new regional" style in modern architecture was adapted for the Library, as a solution to the problem of alienation, into which the "international style" of modern architecture has fallen.[32] The regional input from Kosovo was the region's Byzantine and Ottoman influence. As Mutnjaković states:

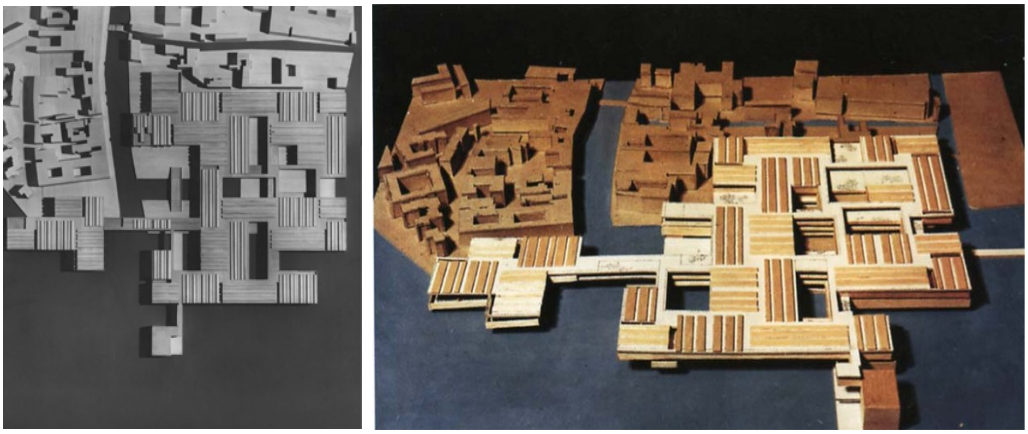
> "A common characteristic of these buildings is their identical treatment of space: a square area of the building covered by a dome. In their details of shape, plane treatment of walls, and the application of iconographic elements and their decorations, these buildings have marked architectural characteristics in common."[33]

In terms of style, the National Library is an example of modern architecture. It is an expression of different architectural languages, which were developed within different stages of modernism, particularly brutalism and regionalism. In this context (both in the stylistic and formal plan), following Carlos Martì Arìs

31. Mutnjaković, "Architectonics Summary," 1984, 130.
32. Kosovo Architecture Foundation, and Getty Foundation, *Conservation and Management Plan. The National Library of Kosovo "Pjetër Bogdani"*, 2017, 23.
33. Mutnjaković, "Architectonics Summary," 1984.

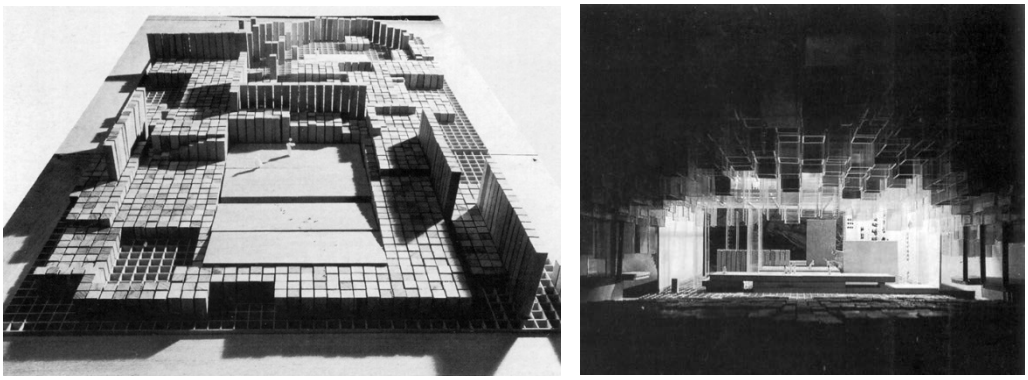
methodology, the building can also be compared by its plan with Le Corbusier's Venice Hospital and Maurizio Sacripanti's Lyrical Theatre in Cagliari (Figures 9 and 10).

Figure 9. *The Venice Hospital by Le Corbusier*



Source: https://www.archdaily.com/789025/ad-classics-venice-hospital-proposal-le-corbusier; https://ucldigitalpress.co.uk/Book/Article/52/77/0/.

Figure 10. *The Lyrical Theatre in Cagliari by Maurizio Sacripanti*



Source: https://socks-studio.com/2012/06/10/lyrical-theatre-in-cagliari-maurizio-sacripanti-1965/

Technological Plan

In the construction of the National Library, for the architect it was very important to use elements belonging to the location, so he decided that the façade of the ground floor would be covered using local stones, the stones which were used in the masonry of the shrine of Sultan Murat, built-in Prishtina.[34] The whole ground floor is treated differently from the cubes, with large tile-like stones, two meters by fifty to sixty centimeters (Figure 11). The whole constructive structure of the Library is made of reinforced concrete, including the foundations, columns, beams, and slabs. The cubes, constructed in situ, are made of concrete, which is also the final layer of their façade, and have large openings covered with glass on

34. Kosovo Architecture Foundation, and Getty Foundation, *Conservation and Management Plan. The National Library of Kosovo "Pjetër Bogdani"*, 2017, 36.

all their sides. The domes, produced in Germany, are made of a light metallic construction, covered with white Plexiglas (Figure 12). In the interior, the ceilings are polyester ceilings from fiberglass, produced in Zagreb. Intending to design a technologically advanced building, the floors are mechanical, so all the installations are distributed in the building through the floor.

Figure 11. *The National Library of Kosovo, Stones on the Ground Floor*
Source: www.socialistmodernism.com.

Figure 12. *The National Library of Kosovo, Picture of Domes*
Source: www.socialistmodernism.com.

For the grid, the initial idea was to have a concrete grid covering the façade, but the building could be overloaded by this concrete element. For this reason, to use a lighter structure, Mutnjaković, and his colleagues, proposed that the grid should be produced from poured aluminum.[35] The whole grid is made of molds that were produced by pouring each model individually. There are around 70,000 pieces and 8 or 9 types of different profiles, "from the empty hexagon to the one divided into 3 pieces, or more pieces than the corner models, the positive corner model, the negative one, and so forth. So, in a way that whole structure connected into one whole".[36]

35. Ibid, 43-44.
36. Ibid.

The whole structure of the building could be decomposed into these elements: reinforced concrete skeleton, concrete cubes, prefabricated Plexiglas domes, glass, and prefabricated metallic grid parts. In the context of Prishtina, which experienced its general development between the 1970s and 1980s, the construction of the Library signifies undoubtedly the new technologies and modes of building production, represented through the mentioned structural elements. Following this, in terms of building production and construction, the metallic grid covering the cubic concrete forms as a pure expression of brutalist architecture and the glass surface as screens through which the internal and external communications with each other, have a remarkable impact on the architectural identity of the National Library.

A Symbol of Identity

The architectural project of the National Library of Kosovo represents the "Yugoslav Identity" constructed through a (re)building program in the name of modernization for the city of Prishtina and other Yugoslav cities at that time. Therefore, the National Library was part of the wider ideological background of Yugoslavia, pointing to the construction of an overall identity for the former federal republic, with the state being the authority that commissioned large-scale public buildings quite potent in conveying the image of a socially, economically and politically progressive state,[37] particularly between the 1960s and 1980s.

The architecture of this period, represented here by the National Library of Kosovo, is a combination of several modernist architectural styles/languages, which emerged in different contexts and places of the world, all with their peculiarities. They were generally accepted among the people and authorities in Yugoslavia and were spatially distributed in the whole region, identifying Yugoslavia as a country open to global events and developments of the time, which was not the case with other socialist countries in Southeastern or Eastern Europe, namely in the Soviet Union and Albania. Thus, the avant-garde architecture in Yugoslavia is also a direct representation of the avant-garde status of Yugoslav socialism.[38]

Besides contributing to the overall image of former Yugoslavia, the National Library is a landmark of the Socialist Autonomous Province of Kosovo (which was created in 1974), aimed at visually stating its political and economic power, as well as its equality with other states within the former Yugoslavia – pointing to the construction of Kosovo's national identity and its status as an independent country. To understand this function of the Library's architecture, it is important to go back to earlier events, particularly to the demonstrations of 1968, organized by the Kosovo Students Union and followed by workers and all groups of Kosovo Albanian society without distinction. They demanded more rights, among which

37. Jerliu, and Navakzi, "The Socialist Modernization of Prishtina: Interrogating Types of Urban and Architectural Contributions to the City," 2018, 66-74.

38. V. Kulić, "An Avant-Garde Arhitecture for an Avant-Garde Socialism: Yugoslavia at EXPO '58," *Journal of Contemporary History* 47 (2012): 161-184.

were equality and autonomy within former Yugoslavia, self-governance, and university in the Albanian language. The University of Prishtina was established in February 1970 and the architectural outcome of this event, was the master plan for the University Centre (1971), followed by the project of the National Library as its central building. The Library is one of the few buildings constructed as planned by Bashkim Fehmiu in the master plan for the University Centre. As such, it ended up being the architectural landmark through which one can identify one of the most important events in the modern history of the city of Prishtina, which opened way to other political and social developments, initially represented by the foundation of the University.

Since its construction, the National Library performed the function of the central library of Kosovo.[39] It served as a place of social interaction, a meeting point for different social groups, and continues to strongly remain this function today. However, it has to mentioned that with the constitutional changes of 1989, after domestic political tensions which led to the breakup of Yugoslavia and the suppression of the autonomy of the Socialist Province of Kosovo, the Library could not maintain its function and social significance. Between 1990 and 1999, Kosovo Albanian readers and workers were not allowed to enter the building, and due to a low number of readers using the facility (as Albanians were a majority in Kosovo), the Library saw its importance diminished.[40] During the late '90s and particularly during the Kosovo War (1998-1999), the building the building was partially used as a Military Base by the Serbian army, which informs us about its central character in a strategic, political, and spatial sense. After the Kosovo War, the building was immediately returned to its original function.

The idea of *identity* – be it regional or national – manifested through architecture as presented above, is not related to the identity of architecture itself. If we go back to the difference between identity and identification, we understand that what the Library represents in terms of politics, economy, culture, or society, is a manifold interpretation of multiple conditions which are identified through architecture. On one hand, for the people of Prishtina and former Yugoslavia, the architecture of the National Library could be interpreted as a symbol of identity for a period of social, economic, and cultural progress, within which they identify themselves as "united" and "equal" inhabitants of a developed country. On the other hand, the citizens of Prishtina, through the Library, identify their struggle as Kosovo Albanians for autonomy and progress within a federation with a predominantly Slavic population. The building identifies the progress (the 1970s 1980s), the stagnation (1989-1999), the Kosovo War (1998-1999), and the "regeneration" of the social life after it.

One of the most characteristic stylistic elements of the Library, the hexagonal metallic grid covering the whole structure, makes it appear as it wants to defend itself against its surroundings, disconnecting the building from external circumstances. On one hand, this relates to the abstract part of Regionalism as a reminder that in several situations, the region's population had been placed in a

39. Kosovo Architecture Foundation, and Getty Foundation, *Conservation and Management Plan. The National Library of Kosovo "Pjetër Bogdani,"* 2017, 17.

40. Ibid, 18.

defensive/defending position.[41] On the other hand, being a modernist reference, while it is used to "control" the interplay of light and shadow, the metallic grid as a techno-aesthetic and techno-artistic element, "conceals" the building's politico-ideological character: a character that represents Prishtina (and Yugoslavia) as bounded to a modern and socialist tradition, as Tafuri (1967) would put it, a utopia through which the future was projected as a contradiction to the full capitalist development and the emergence of postmodernism as the cultural production of late capitalism.

Conclusions

At the end of this article, it can be understood that what started as a preliminary assumption regarding the architectural identity, is disclosed through the case of the National Library of Kosovo, where three different plans that determine its architectural identity are distinguished. In this context, the first plan, the geometric/formal one, is represented by the combination of cube and dome: a classic combination that finds its origin in the case of Byzantine architecture expressed by the case of Saint Sophia. In this plan, the identity of the National Library of Kosovo is expressed through a typological constant that is part of the global architectural history and is manifested in many other famous architectural works. From this point of view, this case is an expression of an almost universal typology and does not constitute any innovation at the architectural level. The two types that can be found in the form of the building, as compared to other examples, are that of an *enclosure* with an inscribed circle and the modernist grid system containing the structural elements of the plan.

Novelty, in this case, is expressed in the stylistic/linguistic and technological plan. As it is clear from the above analysis, it seems almost difficult to define the language or style to which the architecture of the National Library belongs. Constructed at the time when postmodern architecture was developing in the western world, while aiming to represent the "critical regionalism" and at the same time using *béton brut* under a hexagonal metallic grid reminiscent of the famous modernist grid, the building appears as a combination of different linguistic expressions. It is precisely this plan that makes the National Library a unique case in the history of architecture, which more than the expression of local identity, it is a "mixture" of many international expressions, languages, or styles.

At this point, it can be confirmed that this case, which has an architectural identity expressed in the three plans analyzed and described above, – formal, stylistic/linguistic, and technological – is a case with an identity detached from the context. The building constitutes a world architectural heritage by being an expression of different plans of architectural identity that are independent of local forms, expressions, and technologies. The National Library of Kosovo, as an architectural masterpiece with a specific architectural identity, contributes to placing Prishtina and Kosovo on the global map of modern architecture.

41. Kosovo Architecture Foundation, and Getty Foundation, *Conservation and Management Plan. The National Library of Kosovo "Pjetër Bogdani,"* 2017, 94.

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Athens Journal of Architecture - Volume 9, Issue 3, July 2023 – Pages 299-318
(received: 16 August 2022, received in revised form: 7 March 2023, accepted: 16 April 2023)

'Interconnected Groups': Alvar Aalto's Competition for the Pohjola Office Building, Helsinki, 1964-65

By Miguel Borges de Araújo[*]

This article analyses the Alvar Aalto office's competition entry for the Pohjola Office Building, Helsinki (2nd prize, 1964-65, unbuilt), named Maiandros. Aalto described the unique plan for this office building – with connected towers placed on a podium in a park, and a hybrid cellular/open-plan organization – as a plan of 'interconnected groups'. The architectural critic Malcolm Quantrill discussed what remains one of Aalto's least-known designs within the scope of what he called Aalto's "modular works". How and with what objectives did Aalto use the module in Maiandros? Is the project relevant to architectural theory and practice today? Based on a close study of the archival sources in the Alvar Aalto Museum, the current article tests Quantrill's hypotheses, adapting them in terms of modular composition, modular construction and a modular environment. Thus, Maiandros is considered within the contexts of: 1) Aalto's office building designs; 2) the changes going on at that time in Finnish architecture (through a comparison with the winning proposal); 3) the development of the modern office building (using as a reference, Reyner Banham's 1969 book The Architecture of the Well-Tempered Environment).

Introduction

In 1964-65, the office of Alvar Aalto – after 1958, a partnership between Alvar Aalto (1898-1976) and his wife Elissa Aalto (1922-94)[1] – took part in the invited architectural competition for the Pohjola Insurance Company Building (*Pohjola-talo* in Finnish) in Helsinki.[2] The other invitees were Viljo Revell (1910-64), Heikki Sirén (1918-2013), and Eino Tuompo (1917-2012). Aalto went on to the second stage of the competition (Figure 1) but lost the commission of what was then the largest office building in Finland to Viljo Revell (Figure 2). Since Revell died unexpectedly in November 1964, his collaborator Heikki Castrén (1929-80) was effectively in charge of the project, first, during the competition stage, under Revell's name, and then, under his own office name, until the Pohjola Building was completed in 1969.[3]

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1. I have previously researched the collaborative dimension of the Studio Aalto. See, Miguel Borges de Araújo, *The Work of the Studio Aalto Collaborators: Practice, Craft and Theory. Datutop* 36 (Tampere: Tampere University of Technology, 2018). See also a recent publication dedicated to Elissa Aalto: Mia Hipeli (Ed.), *Architect Elissa Aalto* (Jyväskylä: Alvar Aalto Foundation, 2022). From now on, I use Aalto as referring to their partnership and the studio of collaborators.

2. Stage 1 was submitted on December 17, 1964, and Stage 2 on March 9, 1965.

3. The partnership Castrén-Jauhiainen-Nuuttila designed also an extension to the building in 1979. Incidentally, Jaakko Jauhiainen (1934-) had been a collaborator in Aalto's office in 1960-64; Marja Nuuttila-Helenius (1932-2016).

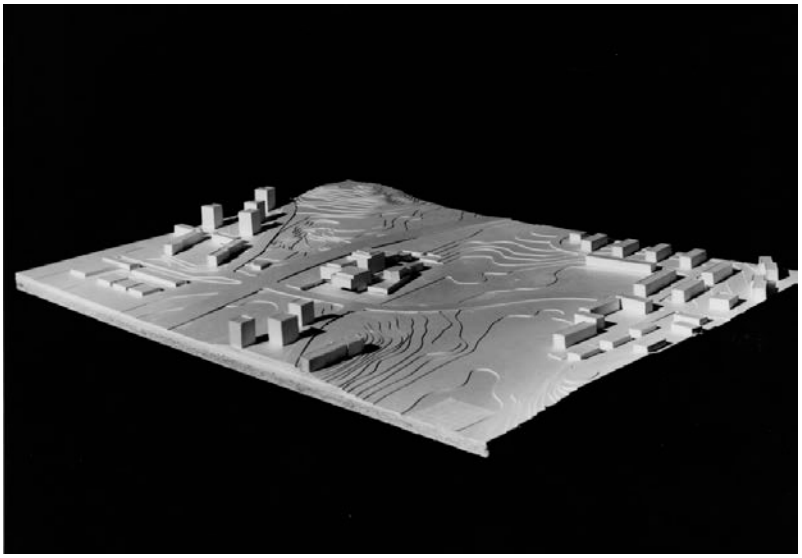

Figure 1. *Alvar Aalto, Pohjola Building, 'Maiandros' (1964-65), Photo of the Scale Model Submitted to the Architectural Competition (2nd prize). Note the Plan of Interconnected Towers*
Source: Museum of Finnish Architecture Archives, Helsinki (MFA).

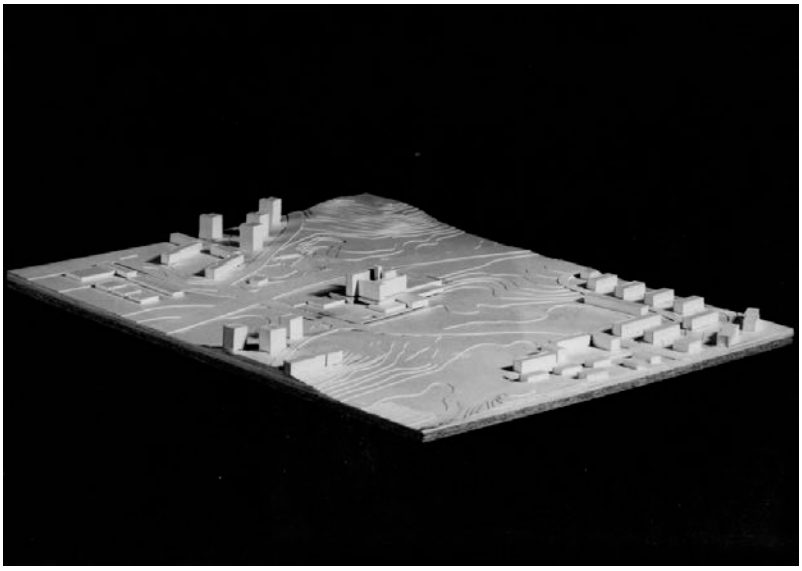

Figure 2. *Viljo Revell/Heikki Castrén, Pohjola Building, 'Byromaani' (1964-65), Photo of the Scale Model Submitted to the Architectural Competition (1st Prize). Note the Pinwheel Tower Plan*
Source: MFA.

In the post-war period, the growth of the service sector, the congestion of historical city centres, and the development of office machinery created conditions for the emergence of large, suburban offices, including in-house car parking and extensive amenities.[4] The nature of office work and the relationship between

4. This process began up to a decade earlier in the US. Louise A. Mozingo, *Pastoral Capitalism: A History of Suburban Corporate Landscapes* (Cambridge: MIT Press, 2014). For

office buildings and the city have notably changed much since then.[5] In 2015, the Pohjola Company moved to new premises closer to a transport hub in the city district of Vallila. The vacated office complex was partly demolished: the main tower, now without its secondary wings, was preserved and took on a new role as a multi-tenant office building and the centrepiece of a mixed-use master plan by JKMM Architects (Figure 3).[6] I visited the Pohjola site in 2021, then under redevelopment (Figure 4), as it ceased to be the headquarters of the Pohjola company to became a new district of the city. It is a large park-like area, known as Niemenmäki, set between two post-war residential districts, Huopalahti to the east, and Munkkivuori to the west, and bordered by a major highway running north-south. My visit and empirical observations sparked a series of thoughts, which, although they go far beyond the scope of this article, I have attempted to synthesize in terms of two antithetical processes: the centralization of office work and suburbanization, and the decentralization of office work and re-urbanization. Is Aalto's project relevant to current architectural theory and design conditions?

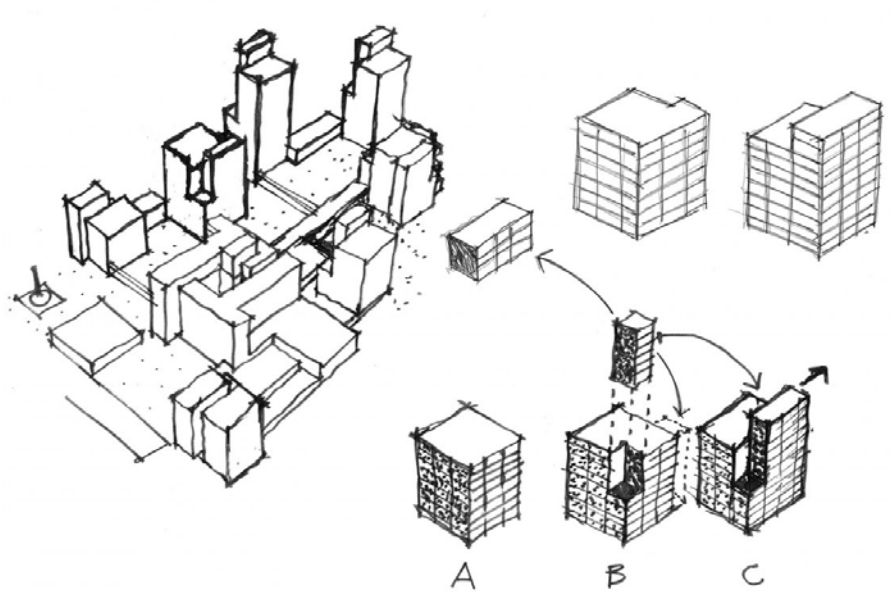

Figure 3. *JKMM Architects/ Samuli Miettinen, Pohjola Housing Urban Planning (1st Prize in Invited Competition, 2014). This Early Sketch shows how the Pinwheel Tower Designed by Castrén (Drawn in a Lighter Grey) is preserved as the Centrepiece of the New District*

*Source:*JKMM Architects.

example, the competition brief for the Pohjola Building, a copy of which can be found in the archives of the Alvar Aalto Museum, included offices for the general administration and for the various units of the company, including the front offices, centralized services, educational spaces, technical departments, restaurant, library, storage, gym, club room, and even rental apartments for employees. *Vakuutusyhtiö Pohjolan uuden toimitalo tilantarvesuunitelma* (Jyväskylä: Pohjola Kilpailu. Alvar Aalto Museum Archives, 1964).

5. For instance, this research was carried out during the COVID-19 pandemic, when social distancing promoted a shift to remote office work.

6. JKMM Architects designed also two of the seven new residential buildings. JKMM Architects, *Pohjola Housing – Urban Planning*.

Figure 4. *View of the Pohjola Site (South), with the Main Tower of the Pohjola Office Building by Viljo Revell/Heikki Castrén (1964-69) in the Centre. To the Left and Right, Respectively, Two (of the Seven) Residential Blocks Proposed for the Pohjola Housing Plan by JKMM Architects (2014-21)*
Source: Photo: Miguel Borges de Araújo, 2021.

The present article, which is part of ongoing research on Aalto's office building designs,[7] measures the Maiandros against other projects and writings, as expounded below. In the process, it adds to a dispersed group of studies on Aalto's unbuilt designs.[8]

The Plan of Interconnected Groups

> The client demands a spatial programme with open-plan offices without corridors . . . Instead of a high-rise office building with a lift, a horizontal office organization was to be proposed because in that way a maximum in flexibility could be attained.[9]

7. I have previously analyzed Aalto's office buildings in the Helsinki city centre. See: Miguel Borges de Araújo, "Alvar Aalto – Environment. Office Buildings in City Blocks: Atriums, Arcades and Spatial Grid Facades," in *(Ever)Green Alvar Aalto*, 4th Alvar Aalto Researchers' Network Seminar Proceedings (Helsinki: Alvar Aalto Foundation, 2018), 135-143.

8. The extreme example of which is Gareth Griffiths's (2020) article on Aalto's Israel Conservatory of Music. In the absence of a building or any design proposals, his sources are the letters exchanged with the client, discussed in terms of Aalto's design principles, the site, and the cultural context.

9. Alvar Aalto, "Pohjola 'Maiandros' Office Building in Helsinki," in Elissa Aalto and Karl Fleig (eds.) *Alvar Aalto. Volume III Projects and Final Buildings* (Zürich: Artemis – Verlag für Architektur, 1978), 78.

Instead of a high-rise building, the Aalto proposal comprised four square towers, three to seven storeys high, connected to each other and placed on a podium. The connected towers, with a hybrid cellular/open-plan organization, create a semi-continuous workspace with good exposure to nature. Drawing from the Ancient Greek river god, Aalto chose as the required pseudonym for the competition entry, which is one of his least-known works, the name Maiandros (Figure 5).[10] Tellingly, the project seems to have been first published by accident: in 1967, Leonardo Mosso (1926-2020), an Italian collaborator of the Aalto office in 1955-58, and one of the first scholars on Aalto, illustrated his description of Aalto's competition for the BP Office Building in Hamburg, Germany (3rd prize, 1963-64, unbuilt) with a photo of a model of the Pohjola Building.[11]

In *Alvar Aalto: Volume III*, the BP and the Pohjola buildings are presented side-by-side and described as plans of "interconnected groups".[12] The two projects show similarities in terms of their suburban location, interconnected towers, and use of grids. The BP towers are open plan (35 metres deep), with four structural bays and the core on the edge of the plan. The Pohjola towers (28,5 metres deep) comprise five bays and a central core. With the decrease in dimension and the change in the position of the cores, the Pohjola Building introduced, as it has been noted by Aalto's biographer Göran Schildt, the option between open-plan and cellular organizations.[13]

10. Maiandros does not feature in the publication about Aalto's unbuilt projects published by the Alvar Aalto Museum. Esa Laaksonen (Ed.) *Drawn in Sand: Unrealised Visions by Alvar Aalto* (Jyyäskylä: Alvar Aalto Museum, 2002).

11. Leonardo Mosso, *Alvar Aalto*: *Teokset 1918-1967* (Helsinki: Otava, 1967), 158.

12. Alvar Aalto, "BP Office Building in Hamburg (Germany)," in Elissa Aalto and Karl Fleig, (eds.) *Alvar Aalto: Volume III Projects and Final Buildings* (Zürich: Artemis – Verlag für Architektur, 1978), 74.

13. Göran Schildt, *Alvar Aalto: A Life's Work: Architecture, Design, and Art* (Helsinki: Otava, 1994), 135, 144-145.

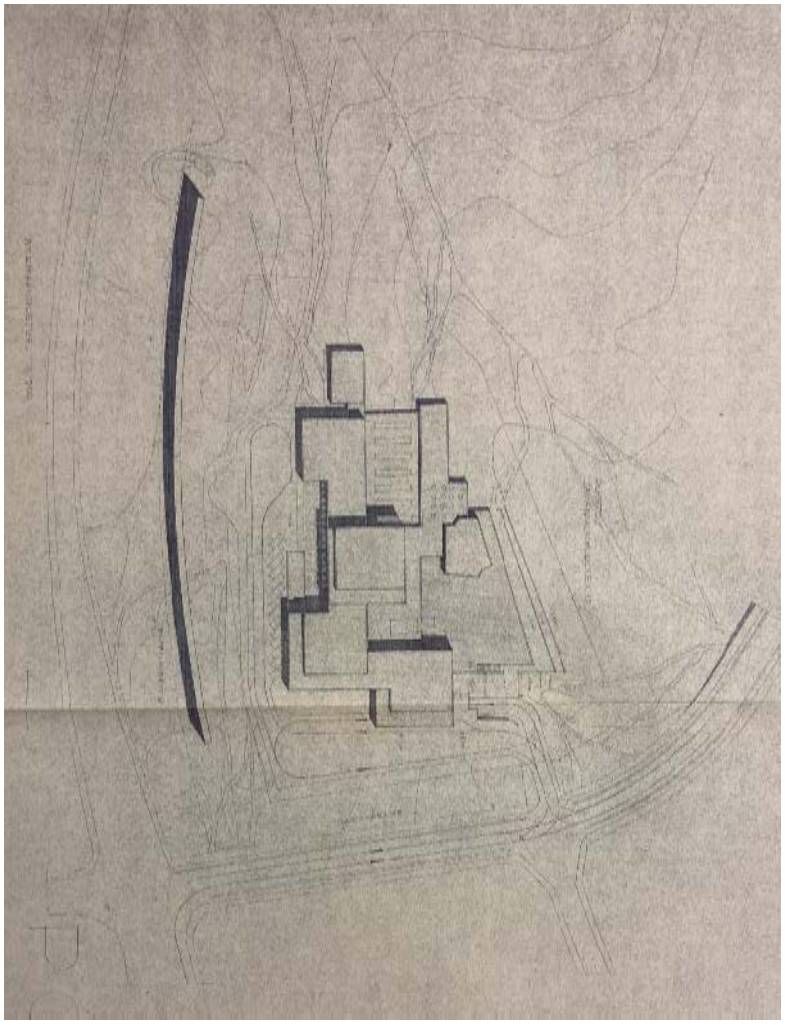

Figure 5. *Alvar Aalto, Maiandros (Stage 1): Site Plan Oriented North Upwards*
Source: Pohjola Kilpailu, Alvar Aalto Museum archives, Jyväskylä (AAM).

Modular Composition, Modular Construction and Modular Environment

Malcolm Quantrill (1931-2009) is one of the few scholars of Aalto's work to mention the Pohjola Building. However, he only analysed it indirectly, in the context of what he called Aalto's "modular works", and as "an extension of the planning system Aalto evolved for the BP Hamburg competition".[14]

Quantrill did, however, outline a few intriguing hypotheses regarding Aalto's modular works. The present article adapted Quantrill's hypotheses in terms of: (1) modular composition, (2) modular construction and (3) modular environment. Module means small measure: the module is a set of dimensions or a geometry that serves as a rule for creating larger units. It is said that Aalto slighted the role of modules in design practice. Maiandros contradicts this: not only is each tower derived from modular dimensions, but it also constitutes the subunit from which

14. Malcolm Quantrill, *Alvar Aalto: A Critical Study* (London: Secker & Waburg, 1983), 153.

the whole complex is derived. Throughout architectural history, modules have been used for different purposes. How, and with what objectives did Aalto use the module?

According to Quantrill, Aalto introduced a new approach to the conception of the plan, based on the repetition of a square unit, in the competition for the Malmi Funeral Chapel, Helsinki (1st prize, 1950, unbuilt).[15] The motive behind the unit and repetition may have been circumstantial: faced with the programme of a large funeral chapel, Aalto preferred to divide the plan into three independent groups and to place the technical spaces in their centre. This resulted in a new relationship between the parts and the whole, in which the wings are equivalent to each other, and the centre is subordinated to them. Eventually, a modular composition developed from the original motive. For example, Quantrill refers to the Maison Carré, outside Paris (1956-9): the plan is based on a grid, over which the solid volumes of the rooms define the free-flowing entrance-cum-gallery-cum-living area.[16] Quantrill even proposed an intriguing but, in my view, somewhat far-fetched parallel with the plans of Palladio's villas.[17]

Quantrill also connected the use of the module to construction materials and techniques, giving the example of the brick experiments in Aalto's Experimental House, his summer residence in Muuratsalo (1952-53).[18] The floor and walls of the courtyard are built out of different bricks and brick bonds. Both rule and exception are used to emphasize the discipline and the expressive geometric possibilities of the module.

Finally, Quantrill suggested the environmental use of the module. He referred to Aalto's recreation of the atrium house type in a multi-storey apartment in the Hansaviertel block, Berlin (1954-7).[19] The plan of each apartment comprises a central square-shaped living room connected to a deep, square-shaped balcony. Furthermore, the apartments, each also square in plan, are clustered in two tower cores, which jointly define an open-air entrance court on the ground floor.

15. Ibid, 137.

16. Ibid, 148.

17. Ibid, 150-153.

18. Ibid, 138-143. Note that Elissa Aalto worked already in the Aalto studio at this time and was a main collaborator in both the Experimental House and the Maison Carré projects.

19. Quantrill, *A Critical Study*, 144-145.

Materials and Methods

The main sources of the present study are the drawings and competition documents kept at the Alvar Aalto Museum archives. I examined two still uncatalogued folders, following the three hypotheses presented above, referring to other projects and writings when necessary.

The possibility of repetition suggests that the form remains somewhat open. One of the initial questions was whether the module represented a derivation of Aalto's typical, centralized plans (as implicit in Quantrill's comparison with the Palladian villas), or an alternative approach. For example, in the context of the rapid urban change at that time, the Japanese architect Fumihiko Maki (1928-) proposed in 1964 a famous distinction between "Compositional Form", "Mega-Structure" and "Group-Form" approaches to "collective form". Maki contrasted the first two, which he saw as essentially "static" or spatial, with an alternative temporal "ordering concept", i.e., "growth and change" (Group-Form).[20] With these distinctions in mind, I proposed comparing the Pohjola Building with other relevant designs by Aalto and reorganizing the archival drawings to produce a plausible reconstruction of the design process.[21]

Quantrill traced the source of Aalto's experiments with brick to the "painterly" influence of the De Stijl, and perhaps more compellingly to a reaction to the studies on Pythagorean proportions led by Aulis Blomstedt (1906-1979).[22] Thus, he pointed to a crucial debate in Finnish architecture at that time, regarding the relationship between architecture and industrial building methods.[23] During the wartime in Finland (1939-44), Aalto, whose first commissions for standardized houses date back to the 1930s, directed a task force created by the Finnish Association of Architects (SAFA), which also included Blomstedt and Revell, for preparing the reconstruction period based on industrial building methods.[24] Disagreements regarding the status of industrial building emerged: Revell arguably represented a materialist and Blomstedt a classical-idealist mode of

20. Fumihiko Maki, *Investigations in Collective Form. The School of Architecture, No.2 – A Special Publication* (St. Louis: Washington University, 1964), 3-6.

21. The documentation in the archives is substantial but not complete. Aalto probably put little effort into preserving the sketches of a losing competition entry; besides, the procedure used at that time of photocopying and editing drafts possibly obliterated part of the evidence. As usual in Aalto's office, the drawings are not dated nor signed. Incidentally, I was able to confirm that one of the collaborators was Eric Adlercreutz (1935-), then also in charge of the Nordic Union Bank, Helsinki (1960-65).

22. Quantrill, *A Critical Study*, 140-143.

23. Blomstedt was an architect, professor at Helsinki University of Technology, editor-in-chief of the architecture journal *Arkkitehti* (1941-45), and joint founder of the journal of architectural theory *Le Carré Bleu* (1958). He exerted a strong rationalist influence over the young generation of architects. On Blomstedt's studies, see Juhani Pallasmaa, "Man, Measure and Proportion. Aulis Blomstedt and the tradition of Pythagorean harmonics," in Riitta Nikula, Marja-Riitta Norri and Kristina Paatero (eds.) *Acanthus 1992. The Art of Standards* (Helsinki: Museum of Finnish Architecture, 1992), 6-25.

24. Elina Standertskjöld, "Alvar Aalto and Standardisation," in Riitta Nikula, Marja-Riitta Norri and Kristina Paatero (eds.) *Acanthus 1992. The Art of Standards* (Helsinki: Museum of Finnish Architecture, 1992) 74-84.

standardization. Instead, Aalto opposed the idea that new technology required the invention of a new architectural language, and he was convinced that industrial building components and practices could be gradually incorporated into the existing tradition according to a more practical process of "elastic" standardization.

Demonstrating humour and a good grasp of the situation at that time, characterized by a widespread belief in technology, Revell and Castrén named their entry for the Pohjola competition, *Byromaani*. The minutes of the competition jury,[25] which describe the "technical implementation" as a main merit of their design,[26] will be used here as a starting point to compare the two projects, thus clarifying the constructive dimension of the module. Interestingly, the copy of the minutes found in the Alvar Aalto Museum is annotated by Aalto (or one of his collaborators), including a list of proposed corrections to the jury's comments. A valuable secondary source is the 2013 building survey report on Castrén's Pohjola Building. The report describes, for instance, how Castrén began the project by testing in a full-scale building prototype the integration of structural and building services design.[27]

Quantrill referred to Aalto's use of the module in view of an environmental objective. In the block quote above, Aalto, referring to the Pohjola Building competition, pointed to the demand for open-plan offices. In the project description for the BP Building, which, as it was seen, employs a similar plan, Aalto added that open-plan offices have spatial limits that "involve the distances of the sources of illumination, windows and possibly other, more or less incalculable factors".[28] This asked for a better understanding of the changes occurring in the design of office buildings at that time, which led me to examine the Maiandros in relation to a contemporary, ground-breaking book: Reyner Banham's, *The Architecture of the Well-Tempered Environment* (1969).

Modular Composition: Spatial or Temporal Order?

My research started by browsing the published volumes of Aalto's complete works and comparing office building designs. Seemingly, the plan of interconnected groups, based as it is on the repetition of a module, presents an exception to Aalto's preferred centralized compositions. As already mentioned, Aalto first used an open-plan in the BP competition, then a hybrid cellular/open-plan in the Pohjola Building. Later, he used one single open-plan module as part of a more complex plan in the competition for the Urban Centre, Castrop-Rauxel (1965,

25. *Palkintolautakunnan arvostelu ehdotuksesta n:03 'MAIANDROS'* (Jyväskylä: Pohjola Kilpailu, Alvar Aalto Museum Archives, 1965).

26. Olli Helasvuo, Riikka Koivula, Maren Nielsen and Tapani Mustonen, *Pohjolan Toimitalo Lapinmäentie 1. Rakennushistoriaselvitys ja arkkitehtuurianalyysi* (Helsinki: Arkkitehdit Mustonen, 2013), 24-25. The report, which includes extensive drawings and photographs of the building, is available for download on the website of Arkkitehdit Mustonen: "Pohjolan Toimtalo", Arkkitehdit Mustonen, https://www.arkkitehditmustonen.fi/projects/pohjolan-toimitalo/. [Accessed 1 March 2023.]

27. Helasvuo et al., *Pohjolan Toimitalo*, 27-28.

28. Aalto, "BP Office Building", 74.

unbuilt).[29] Besides, Aalto's office workspaces are typically cellular. Cellular workspaces tend to be combined into linear wings, and wings into centralized compositions. In an open area, the wings serve as support to a dominant volume containing the social spaces. In a city block, the social spaces and the workspaces are stacked vertically, and the centre of the compositions is marked with an atrium.

In the House of Culture, Helsinki (1952-58), the office spaces are located in a rectangular wing perpendicular to the street that, juxtaposed with the free-curving auditorium wing, defines the entrance wing between them. Not *stricto sensu* an office building, the Helsinki University of Technology, now Aalto University, Espoo (1949-67), shows how the same theme adapted to a large campus. Conversely, in the Finnish Engineers' Association Building in the centre of Helsinki (1948-51), the office wing completes the street frontage, and the special hall develops below it through the interior of the urban block. Nearby, in the Rautatalo Building (1951-57), three office wings form a C-shape atrium inside the urban block. The most complex of Aalto's office buildings is the National Pensions Building, Helsinki (1948-56): in a tight triangular plot, the plan presents a composite of the two types described above: part is compact, with the office wings closely knit around a rectangular atrium, and part is open plan, with the wings articulated with the terraces.

If Aalto's office buildings broadly correspond to what Maki described as Compositional Form, the Pohjola Building, with its modular approach, could suggest an approximation to Group-Form. At this point, it became necessary to make a close study of the archive drawings. According to my reconstruction of the design sequence, Aalto started from his favourite centralized theme. In the initial stages (Figure 6), the dominant volume was a hollowed, cubic volume, six-storeys high. Linear wings extended from each corner of this dominant volume. Aalto may have had reservations about the quality of the light in the inner courtyard, which in the lowest levels was a covered atrium. Or perhaps he felt it necessary to address the expectation for open-plan offices. In a second group of drawings (Figure 7), the inner courtyard is eliminated, and the central volume becomes as narrow as the (now) three wings that extend from it. An entrance atrium appears between the south wings and a second atrium on the east side. In the final stages (Figure 8), the entrance atrium is also eliminated, the linear wings are replaced by open-plan modules, and extensions are introduced between the square modules. The similarities with the meandering arrangement of the BP project become clear (notably, in the end, rather than at the start of the design process).

29. Alvar Aalto, "Urban Centre, Castrop-Rauxel (Germany)," in Karl Fleig (ed.) *Alvar Aalto: Volume II 1963-1970* (Zürich: Artemis – Verlag für Architektur, 1971), 26-29.

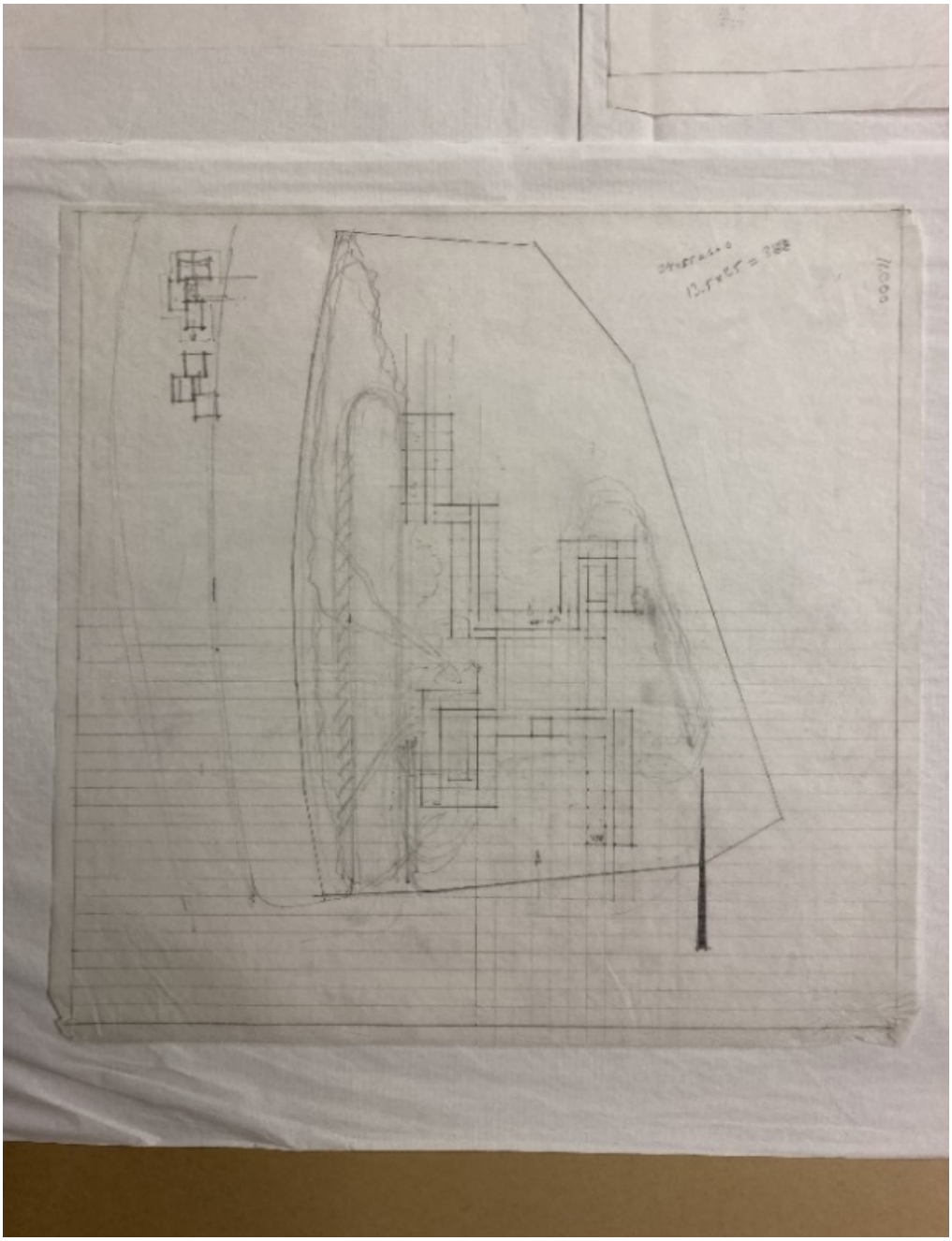

Figure 6. *Maiandros (Stage 1), Plan Oriented North up (Initial Design stage)*
Source: Pohjola Kilpailu, AAM.

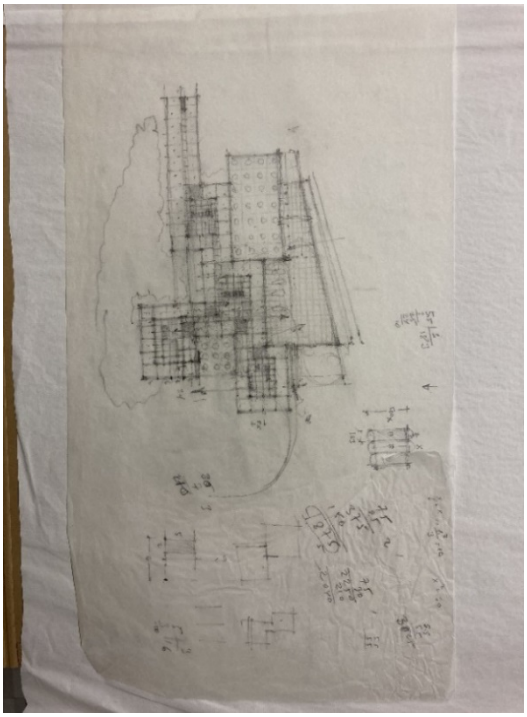

Figure 7. *Maiandros (Stage 1), Plan Oriented North Upwards (Intermediate Design Stage).*
Source: Pohjola Kilpailu, AAM.

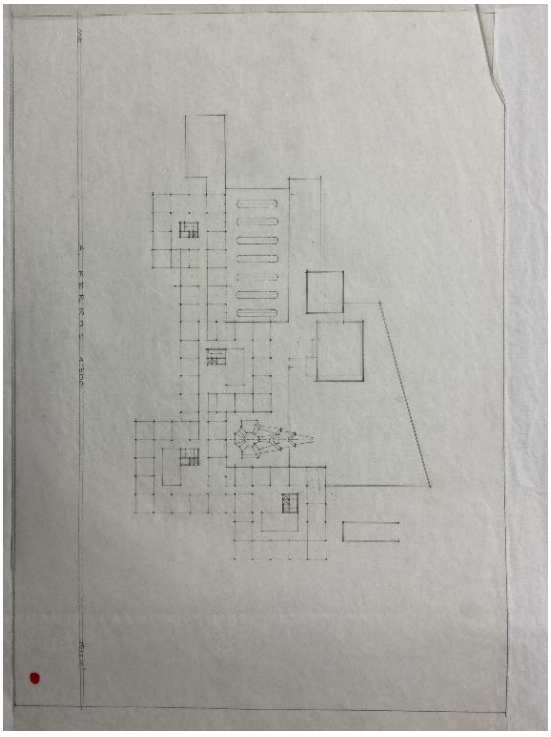

Figure 8. *Maiandros (Stage 1), Plan Oriented North Upwards (Final Design Stage)*
Source: Pohjola Kilpailu, AAM.

The proposed design sequence suggests that Aalto conceived the module in spatial, rather than temporal terms: the vertical organization of the building, with the interconnected towers coupled with the centralized ground floors, marked by a double-height atrium with a projecting lantern, establishes a spatial limit and even a topographical orientation. Consequently, the repetition of the square modules at most creates the illusion of a process of growth and change. But the analysis of this group of drawings helps to contrast Aalto's and Maki's approaches in another way: the successive drawings suggest a design practice based on composition, i.e., on introducing and testing relationships, asymmetries, fragmentations, etc. Thus, the Pohjola Building combines some of the compactness of Aalto's urban office buildings with the openness to the landscape that is characteristic of his suburban plans.

Modular Construction: Structural Grid and Grid Façade

The "Competition jury's evaluation", Stage 1, describes the Maiandros as a centralized office building with four connected towers.[30] The jury was impressed with the integration of the building masses on the site, and with the character of the building without excessive decoration. It expressed reservations about the integration of the technical spaces and some details, for example, the ambiguous treatment of the sloping roofs used to disguise the elevator rooms on the top floors. These points were reiterated in Stage 2, with the jury highlighting by contrast the technical (if not visual) clarity of Castrén's design.[31] Taking these comments as a starting point, I started comparing the projects, focusing on their structure and façades.[32]

Both Aalto and Castrén concentrated the special room programmes on the ground floor and used a structural grid to simplify the design and construction. In a multi-storey building, the outline of the structural elements is very important, since it affects the flexibility of the workspaces as well as the articulation between the lower and upper parts. In Aalto's design, not only a tower is a module to be repeated, but the tower itself is modulated by a structural grid. This grid is compact, with 5,5 x 5,5 metre bays and slender pillars and beams that allow greater control over the massing. One bay can be divided into two cellular offices, two bays into three offices, etc. The grid permits exceptions: for example, in each tower module, the four central pillars are replaced by the solid walls of the service core. A wider area for socializing including a pantry is thus created in the centre. A similar, elastic conception surfaces when comparing the Pohjola Building and the BP Building: whereas in the latter, the modules are simply juxtaposed, in the former, an additional, extension element is introduced. The extension increases the elasticity of the plan since its dimension (i.e., the dimension of the gaps between modules) can be individually adjusted to improve the articulation between the towers, podium, and underground parking. Indeed, perhaps the biggest change

30. *Palkintolautakunnan arvostelu ehdotuksesta n:03 'MAIANDROS'* (1965).
31. Helasvuo et al., *Pohjolan Toimitalo*, 25.
32. See note 26.

between Stages 1 and 2 results from the jury's suggestion to relocate the car parking, originally located in a second basement (Figure 9), to a new position between the building and the western limit of the plot (Figure 10). In its final version, one basement is eliminated, the parking is less cramped, and the access from the parking to the atrium (on the basement and semi-basement levels, respectively) is improved.

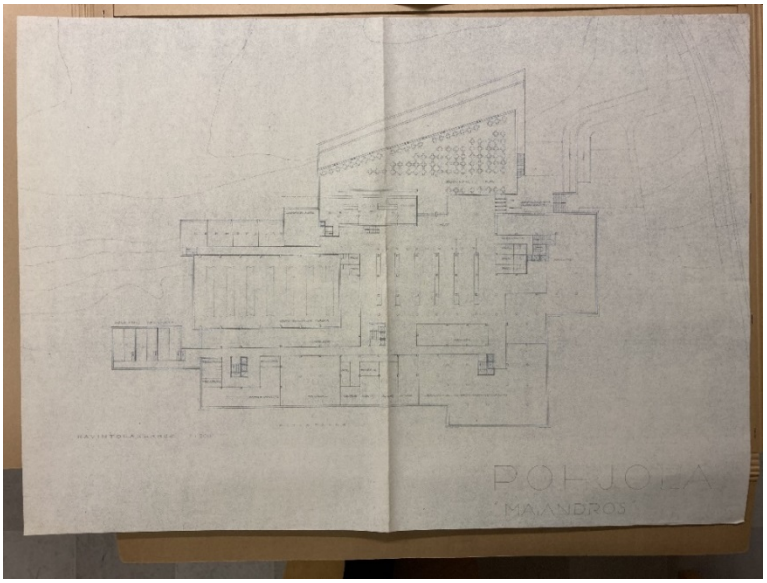

Figure 9. *Maiandros (Stage 1), Basement Plan, the Car Parking is One Level Below this on Level -6.0.*
Source: Pohjola Kilpailu, AAM.

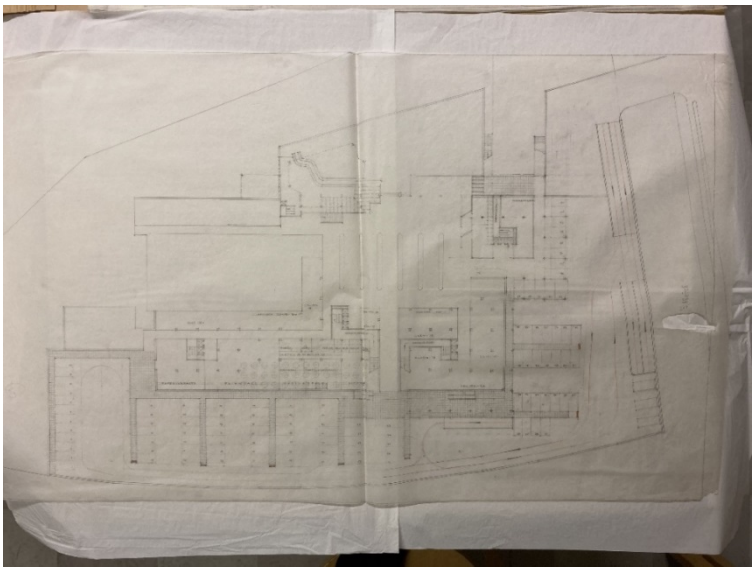

Figure 10. *Maiandros (Stage 2), Basement Plan, the Car Parking is Between the Building and the West Limit of the Site*
Source: Pohjola Kilpailu, AAM.

Castrén's design exemplifies the primacy of the system, starting from the choice of the building material and technology. Large precast concrete elements produced offsite are assembled into a pinwheel plan, with four identical wings centred on a central shaft. Castrén used a much wider 8,5 x 8,5 metre grid. The structural elements are clearly articulated, including twin-pillar and twin-beam elements that create a technical channel for the building services.[33] This solution extends to the design of the façade in a way that, as we have seen, convinced the jury.

In Castrén's design, the structural elements accumulate the role of infrastructure and extend out to the façade. In Aalto's design, a skeleton frame is enclosed by a non-loadbearing façade. Although Aalto was sceptical about rigid industrial building systems, he was not opposed in principle to prefabrication. A large commission like this could have, conceivably, provided the occasion to experiment with prefabrication, which at that time was becoming widespread.[34] As objected by the jury, the drawings of Maiandros remain relatively open regarding this level of detail. Aalto tested at least two alternative grid façades, each of them coherent with the structural grid, and thus with the module. Initially, the grid is vertical in proportion (Figure 11), later it is horizontal and clad in granite (Figure 12). It should be noted that both Aalto and Castrén choose granite as the façade cladding material, possibly a nod to the façade of the historical headquarters of the Pohjola Insurance Company on Aleksanterinkatu, Helsinki, designed by Gesellius, Lindgren & Saarinen (1899-1901).[35] Based on other grid façades designed by Aalto, it is possible to speculate that the grid façade could have combined craftsmanship with industrial techniques. For example, Aalto often introduced a rhythm to the grid façades by adding a second cladding material, or by playing with fixed and operable window elements. A handmade correction made over a draft of the elevation suggests that in the Pohjola Building, the rhythm could have resulted from an irregular arrangement of the mullions, as in the façade of the National Pensions Institute (Figure 12).

Modular Environment: Between Building and Nature

According to the third hypothesis in this study, Aalto used the module to establish an environmental unit capable of sustaining and making tangible to the senses the relationship between building and nature.

As mentioned earlier, Aalto had reservations regarding the limits of large open-plan spaces.[36] His approach can be considered as being counter to the context of the evolution of the modern office building. For this, I refer to a contemporary book, Reynar Banham's *The Well-Tempered Environment* (1969).

33. Helasvuo et al., *Pohjolan Toimitalo*, 64-79.

34. Aalto (unsuccessfully) attempted this step in the contemporary project for the Gammelbacka Housing area, Porvoo (1966, not built).

35. Herman Gesellius (1874-1916), Armas Lindgren (1874-1929) and Eliel Saarinen (1873-1950).

36. Aalto, "BP Office Building", 74.

Banham describes how the development of building services contributed to the emergence of tall and deep-plan buildings. Among other problems, power-operated buildings (supposedly) made the interiors limitless and separate from the surrounding environment, while the change of status of the building services raised questions of representation. Two of Banham's examples illustrate this: Frank Lloyd Wright's (1867-1959) Larking Building, Buffalo, USA (1903-06, demolished in 1950), and Louis Kahn's (1901-74) Richards Medical Research Laboratories, Philadelphia, USA (1957-62). The Larkin Building, formed by two open-plan wings on each side of a narrow atrium, explored early innovations in lighting and mechanical ventilation and thus anticipated deep-plan buildings.[37] Interestingly, Castrén's collaborator Juhani Katainen (1941-) described the principle of the Larkin Building as an inspiration for the Pohjola Building.[38] According to Banham, Kahn was the first to resist the technical possibilities of air-conditioning when the technology became mainstream in the 1960s.[39] Instead of concentrating the laboratories in one large building, he broke down the programme into small units for the sake of preserving the scale and clarity of the interior space. Moreover, he displaced the infrastructure to the outside, making it invisible from the inside, thus introducing a distinction between "served" and "servant" space.[40]

Like the Larkin Building, Castrén's Pohjola Building is based on a central space that is essential for the environmental performance of the building: fresh air is forced-in, flowing upwards through it. Because of its vertical proportion, however, this space lacks the scale that, in the Larkin Building, rendered visible the exchange between outside and inside. Furthermore, the Pohjola Building exemplifies the interest, seen also in the Richards Laboratories, in the visual representation of the building services. As mentioned in the previous section, the façade elements were meticulously designed to integrate structure and ventilation. The increased status of the infrastructure is demonstrated by the location of the machine rooms, inserted between the social spaces and the workplaces, in what was traditionally the building's *piano nobile*.

Although Aalto was, throughout his career, interested in the building services technology,[41] his buildings hardly prioritize this aspect. In Maiandros, the freestanding site plan, north-south orientation, interspersion of solids and voids, and integration in the topography, suggest instead a close relationship with established environmental models (Figure 11). The scaled-down volumes bring the building into the scale of the surrounding parkland and residential areas. Conversely, the gaps between the towers create diagonal vistas and facilitate navigation through the workspaces. To be sure, the plan of interconnected groups

37. Reyner Banham, *The Architecture of the Well-Tempered Environment* (London: The Architectural Press, 1969), 86-92.

38. Helasvuo et al., *Pohjolan Toimitalo*, 23.

39. Banham, *The Well-Tempered Environment*, 181-182, 208-228.

40. Banham, *The Well-Tempered Environment*, 248-257.

41. For an account of the innovations in building services in Aalto's Vyborg Library (1927-35) and National Pensions Institute Building (1949-1956), see, Seija Linnanmäki, "Aalto's ideas on air-conditioning – how Finland became a 'Fanland'?," paper presented at the *Alvar Aalto Researchers' Network Seminar*, Seinäjoki, 12-14 March 2012.

would have afforded not only four aspects for each tower but also a series of openings into the sunken podium, including a lantern in the atrium, conical reflectors in the library, gym, and printing rooms, and a panoramic window, connecting the restaurant to the park and the morning light. In each of these instances, the notions of comfort and landscape are intertwined, as in the combined living room and balcony of the Hansaviertel block.

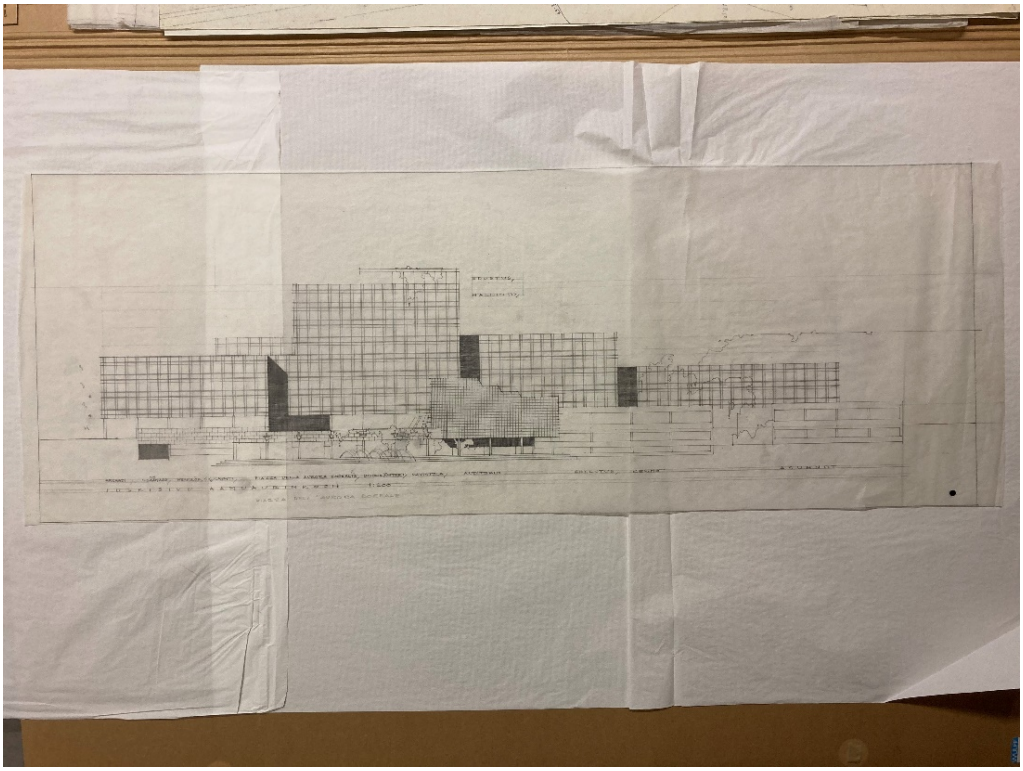

Figure 11. *Maiandros (Stage 1), East Elevation (Study with Vertical Grid Façade)*
Source: Pohjola Kilpailu, AAM.

Like Kahn, Aalto resisted the technical possibilities and established a spatial limit or module for the plan: 28.5 x 28.5 x 3 metres. This limit also involved a distinction between a central area for temporary use, and a well-lit area for intensive work along the edges of the module, 7 metres deep. It should be noted, however, that since Aalto conceived the plan in terms of an alternative cellular/ open-plan use, the spatial quality of this central area would have been subject to the number of partitions added. Kahn granted infrastructure the status of servant space, and hence visibility. Instead, Aalto hid the machine rooms in the basement and made the ducts run through the tower cores. In Aalto's cellular office buildings, he uses the partitions between cells and corridors to create suspended ceilings. The height is therefore lower in the corridor than in the workspaces, while near the windows, the slab edges are upturned to maximize the inflow of daylight. Whereas in a cellular office, the user often has control over the windows, in an open-plan

office, control is centralized. The drawings of Maiandros do not show how Aalto would have solved the nuances introduced by the open-plan organization.

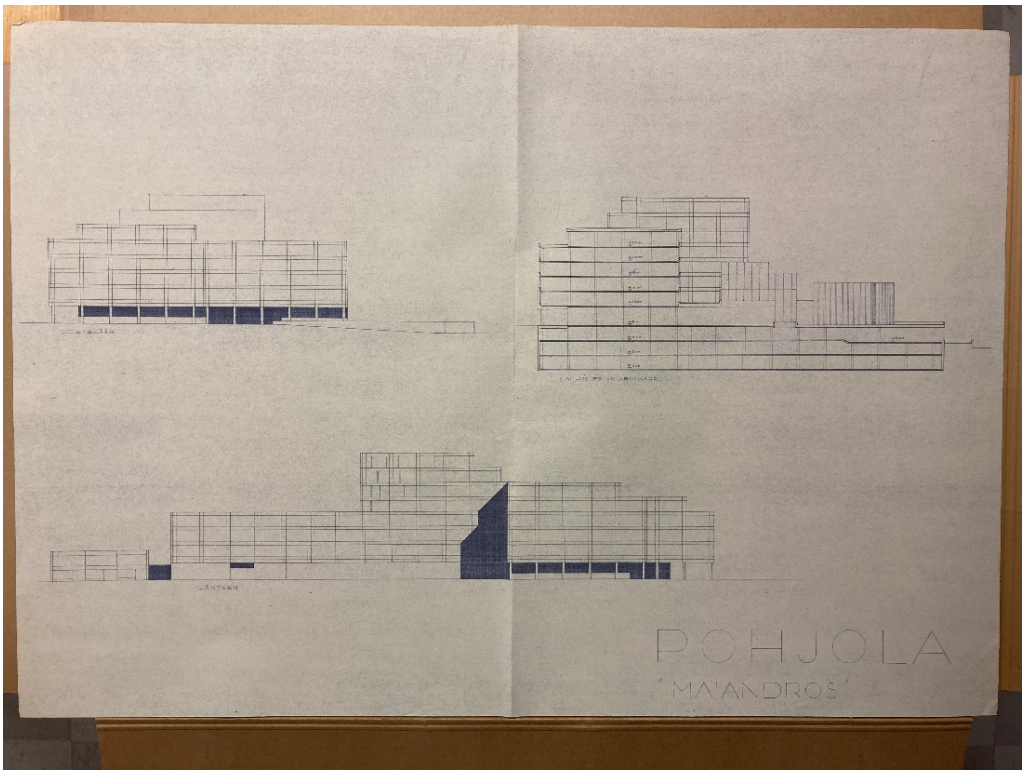

Figure 12. *Maiandros (Stage 1), South and West Elevations, Longitudinal Section (with Corrections Sketched by Hand)*
Source: Pohjola Kilpailu, AAM.

Discussion

The post-war period created conditions for the centralization of office work in large company headquarters located outside city centres. In this context, Aalto's competition design for the Pohjola Building tested what Quantrill called a "modular" approach. At a time when the site of the realised competition's winning proposal by Castrén is being redeveloped, it seems worthwhile going back to Aalto's alternative proposal. The comparison with other office building designs by Aalto demonstrated that Maiandros owes something to Aalto's other urban office buildings, that is, the vertical organization of the social spaces around an atrium and the workspaces above. The close study of the archival drawings suggests that, starting from a centralized composition, Aalto arrived at a solution combining centralized and decentralized principles by establishing (and repeating) a small unit (a tower module). This complex spatial order arguably provides greater flexibility for use.

Quantrill underscored the relationship between the module and the discipline imposed by materials and techniques. To what extent do the latter two condition the former? The development of industrial building methods in Finland at that

time made this a critical issue. On first inspection, Aalto's use of a structural grid and grid façade could suggest an interest in industrial methods, and therefore a convergence with Castrén. However, Aalto's grids remained only lines on paper, intended to ease the design and construction tasks. The grids and modules conceived in this way enable play: as in the (missing) central pillars that break the regularity of the structural grid. Aalto arguably considered that design and construction should relate in an elastic way and influence each other reciprocally. The drawings of the grid façades suggest that Aalto was not overly concerned with anticipating the details. However, it is well-known that the development of industrial building methods went rapidly in the opposite direction. By focusing on construction, the analysis highlighted the historicity of the project: the lost competition arguably marks the moment Aalto begins to lose his influence in Finnish architecture.

According to *The Well-Tempered Environment*, the development of the modern office building went towards a growing dissociation between building and nature, but also a growing concern with the status and representation of the building service infrastructure. The analysis of the Maiandros competition entry confirms the hypothesis adapted from Quantrill of Aalto's conception of a modular environment. Indeed, and in light of current concerns, Aalto's approach seems to represent a more advanced understanding of the issue of ecology. As exemplified in the design of the interconnected towers (each providing four visual aspects) and of the topographic podium with special openings, Aalto conceived of comfort and landscape as connected notions. His objective was to create not only a well-performing and comfortable space but also an image of the latter in terms of a balanced relationship between natural and built elements.

Acknowledgments

This work was supported by a grant from the Finnish Cultural Foundation (2021). I would like to thank the Alvar Aalto Museum and the chief curator of the drawing archives, Timo Riekko. I would like to thank JKMM Architects and the Museum of Finnish Architecture for granting permission to use their images in this article. Special thanks also to Gareth Griffiths who carefully read and edited the final draft.

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Athens Journal of Architecture - Volume 9, Issue 3, July 2023 – Pages 319-334
(received: 1 August 2022, received in revised form: 6 March 2023, accepted: 17 April 2023)

Mixing Specific and More Universal Design Media to Deal with Multidisciplinarity

By Karel Vandenhende[*]

In this paper, we investigate which strategies designers use to be able to deal with multidisciplinarity in architecture, and by which media designers communicate in this changed conditions. From a literature review, we learn that designers have to use an unpredictable, often long and iterative process in which the cycle of concept, testing, evaluation and conclusion is repeated until a satisfactory solution has been formulated.[1] *This turns the design process in an almost endless sequence of models, drawings, texts, images, samples, mock-ups, renderings and other media. And at the same time, designers have to be able to check if all these different investigations match with each other. On the one hand, designers seem to use all kinds of different and distinct media and many different forms of representation to investigate the wide variety of constraints. And on the other, they synthesise all these investigations with diagrams and schemes that bring together all the separate design investigations, and make it possible to match the results from the distinct disciplines. In architecture today, designers seem to combine specific representations, or jargon, together with more universal standard media, at the same time integrating the peculiar and the general.*

Introduction

Recently, architecture seems to be marked by boundlessly crossovers. Today, new types of programs, new technologies, new contexts and new criteria all come together in a single project.

By reviewing research and publications about the design process and about design media, we investigate which strategies designers use to be able to deal with multidisciplinarity in architecture. And more specifically, which design media do they use during the design process. We will see that we can identify two types of media: on the one hand, designers seem to use all kinds of different and specific representations and many different forms of representation to investigate the wide variety of constraints. And on the other, they synthesise all these investigations with more universally understandable diagrams and schemes that bring together all the separate design investigations, and make it possible to match the results from the distinct disciplines.

We used this dichotomy to redefine an assignment as a project in phases, to help architectural design students to know what to do and when. To know what design document to make on which moment.

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1. Hilde Heynen, Smets Marcel and Shannon Kelly, *Research by Design in Architecture and Urbanism* (Leuven, 2010).

Literature Review

Design Problems: A Multitude of Requirements

Architectural design is a form of problem solving in which designers have to deal with many requirements. Ranging from constraints concerning the distribution of towns to constraints concerning the distribution of light fixtures.[2] In the case of the design of an Indian Village, Christopher Alexander[3] stated that he worked with up to 140 requirements. Indeed, architecture deals not only with solids, but also with voids.[4] Not only with qualities, like characteristics, composition and poetry, but also with quantities like dimensions, configurations and rational logics.[5]

Not only with the house, but also with details; its rooms and even its furniture, and also with its context; its neighbourhood and the city.[6] Or in other words, there are not only the programmatic requirements concerning the quantities of spaces on the one hand, and the qualities of the corresponded places on the other. There are also requirements concerning the materialisation; the qualities of what we can call 'objects' and the quantities of their corresponded masses. And finally, on each scale, there are also requirements concerning context and detail.

This multitude of requirements makes designing and design research complex, and it makes educating students how to design not an easy job. How do designers manage to deal with all these constraints?

The Design Process as an Iterative Process: A Cycle of Divergence and Convergence

Concepts are the underlying ideas and theories that inform the design process. These emerge from a combination of research, analysis, and intuition. Designers may start with a general idea and then refine it through a process of iteration and experimentation. Unless the design proves completely successful, as Lawson[7] formulates it, one of two things happens to halt this evolutionary phase. Either the solution reveals itself not good enough to meet several requirements, or so many modifications need to be made that the idea behind the solution is lost and abandoned. In either case, the designer is likely to choose the revolutionary step of starting a new investigation.

The significance of producing multiple options or alternatives cannot be overstated. According to Marples,[8] the nature of the problem can only be found by examining it through proposed solutions, and it seems likely that its examination through just one proposal leads to a very biased view. It is likely that attempting at

2. Christopher Alexander, *A Pattern Language* (New York: Oxford University Press, 1977).
3. John Chris, Jones, *Design Methods* (New York: John Wiley & Sons, 1992).
4. Francis D. K. Ching, *Architecture: Form Space and Order* (New York, 1979).
5. Brian, Lawson, *Design in Mind* (Reed: Oxford: The Architectural Press, 1997).
6. Eliel Saarinen, *Time Magazine* (2 July 1956).
7. Lawson, *How Designers Think* (Oxford: The Architectural Press, 1980).
8. D. Marples, *The Decisions of Engineering Design* (London: Institute of Engineering Designers, 1960).

least two vastly different answers is necessary to gain a complete understanding of the problem's actual essence by comparing smaller parts of the problem.

More recently, Nigel Cross[9] has confirmed that designers seem reluctant to abandon early concepts, and to generate a wide range of alternatives. While designers' primary focus should be to find a solution to the design problem, it can be advantageous to examine several concept solutions during the process. This multi-solution method can lead to a more thorough evaluation and comprehension of the problem. Or as Heylighen[10] puts it; "the ill-defined nature of a design problem appears to necessitate the generation of alternatives to explore and understand its full complexity". As stated by Lawson,[11] it may be more advantageous for designers to apply divergent thinking liberally rather than being too restrictive with it. Most people find it easier to think in a convergent manner when required. In fact, reason is more easily managed than imagination, and the outputs of imaginative thinking can easily be examined rationally later.

Designing is thus an iterative process in which the cycle of concept, test, evaluation and conclusion is repeated until a satisfactory solution has been formulated.[12] Designers begin by creating an initial solution, then they assess that concept through drawings, models, or other media. Based on this assessment, they either modify their solution or create a new one. This is followed by another cycle of evaluation, and the development of further variations, and so on.

Leading to More Architectural Quality

When examining what contributes to quality in architectural design, the most effective solutions appear to be interconnected, encompassing multiple elements at once. High-quality designs are not simply a collection of separate solutions addressing individual constraints, but instead, they aim for concepts or solutions that span multiple constraints at the same time. These ideas are also known as integrated or composite solutions.

The concept of integration has been expressed in various ways by different authors in the past. According to Rasmussen,[13] a building's appearance is only one of several factors of importance. In a good building, the plans, sections, and elevations must be in harmony with each other. Architecture is viewed as an indivisible entity, something that cannot be separated into distinct parts.

Ideas encompassing multiple topics are also called integrated[14] or composite.[15] Zumthor[16] believes that architecture is at its most beautiful when everything is in harmony, when everything refers to everything else, and when removing a single

9. Nigel Cross, *Designerly Ways of Knowing* (Basel: Birkhäuser, 2007).

10. Ann Heylighen, "Less is More Original," *Design Studies* 28 (2007): 499-512.

11. Lawson, *How Designers Think*, 1980.

12. Heynen, Marcel and Kelly, *Research by Design in Architecture and Urbanism*, 2010.

13. Steen Eiler Rasmussen, *Experiencing Architecture* (Cambridge: MIT Press, 1959), 9-33.

14. Jones, *Design Methods*, 1992.

15. G. Goldschmidt and D. Tatsa, "How Good are Good Ideas? Correlates of Design Creativity," *Design Studies* 26, no. 6 (2005).

16. Peter Zumthor, *Atmospheres: Architectural Environments - Surrounding Objects* (Basel: Birkhauser, 2006).

element would destroy the entire structure. In this way, form is a reflection of the location, the location is unique, and the use reflects this and that. In quality architecture, form, construction, appearance, and function are no longer separate entities. They belong together and form a whole. Siza views design as a delicate balance of all the different aspects of the project, including social, functional, environmental, economic, and contextual issues.[17] And Kersten Geers from Office KGDVS states that internal consistency is the main criterion to distinguish good from bad architecture.[18]

Different Media

Today, during the design process, designers must strive to address a vast number of constraints simultaneously. Many of these constraints are so specific that they have to be evaluated using various media. For example, it can be challenging to compare the context of a building with the detail of a door handle or to align objective measurements (represented in technical drawings) with subjective experiences (conveyed through associative images).

On the one hand, designers seem to use all kinds of different and distinct media and many different forms of representation to investigate the wide variety of constraints. And on the other, they have to synthesise all these investigations with diagrams and schemes that bring together all the separate design investigations, and make it possible to match the results from the distinct disciplines.

Digital versus Analogue

When talking about design media in architectural education; the question whether we should focus on digital or analogue media easily pops up. But both have their advantages and disadvantages. Virtual media are efficient and easily adaptable. Analogue media incorporate tactility and express better the designer's chosen position. In fact, more important is to use the right model on the right moment in the design process.

Typical media for testing the quantities of a concept are objective, detailed, sharp, universal and measurable. Bottom-up drawings made with typical cad-software are excellent for this.

But for testing the qualities of a concept, like the characteristics of architectural objects and places, design media should be like the way you experience a building while visiting it. This means that media for testing qualities should be subjective, holistic (top-down), unfocused (faded), personal and associative (relative). Like hand drawn sketches and schemes, made with paint, or soft pens or crayons. The ambiguity in sketching also stimulates typical creative processes like "analogy", "mutation" and "combination". Sketches have the benefit of being open to interpretation at the start of the design process, but it is the combination of sketches and other media that leads to high-quality design outcomes. The thickness and

17. Alvaro Siza, *Simplicity is Always Complex* (Abitare.com).
18. Kersten Geers, *Architecture as a Craft* (2011).

"unsharpness" of sketching forces the designer to concentrate on the main lines of the design. While the exactness of hard pencils, fine pens or cad-software lets the designer focus on detailing. It's this combination of simplicity and complexity that makes a "work" comprehensible and exciting at the same time.

Mixing Media

While searching in a design process, designers quickly hop from one investigation to another. And at the same time from one medium to another, often on the same drawing. In a drawing of a first design, Le Corbusier[19] combined the three floor plans together with sketches that showed the interior and exterior of the villa (Figure 1).

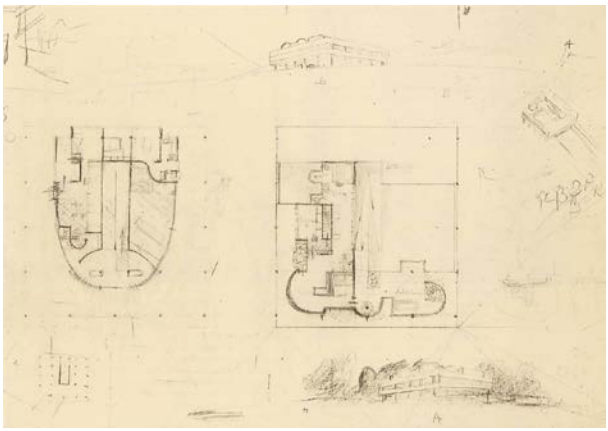

Figure 1. *Part of the Drawing of the First Design of Le Corbusier for the Villa Savoie in Poissy, Near Paris, September 1928 (FLC 19583 ©FLC-ADAGP)*

Many architects and theorists have discussed the use of multiple design media during the design process. Caruso believes that different forms of representation, such as overall concepts, perspective views, and solutions for details, can help to make the diversity of constraints more apparent.[20] Lawson[21] agrees that design drawings in architectural practices often incorporate multiple media, with 2D plans and sections appearing alongside sketches and diagrammatic marks on the same piece of paper. Neutelings[22] also recognizes the importance of various modes of representation in the design process and believes that the skill required to design is closely linked to the different media available. Different forms of representation are used for specific aspects of the design process, such as using thick felt pens for organizational charts, relief models for facade studies, computer drawings for proportional measurements, and volumetric models for massing. Each medium has its own moment and logic in the design cycle. By repeatedly visualizing and

19. Karel Vandenhende, "The Innovation Paradox: Starting from what is 'Known' to Facilitate the Discovery of the 'Unknown'," in *Conference Proceedings EPDE2013* (2013).

20. Adam Caruso, "Over Maquettes en Beelden," *Oase: "Models/Maquettes"* no. 84 (2011). 138-139.

21. Lawson, *Design in Mind*, 1997.

22. Willem-Jan Neutelings and Riedijk Michiel, *At Work* (Rotterdam: 010, 2005).

testing the design using different media, the circumscriptions become narrower and by each time drawing and constructing an as yet unknown facet, the design becomes more exact and clear-cut. In the beginning there are only vague blurs behind a steamed-up window; in the end your imagination can even smell the beeswax on the parquet floor. The combination of text, images, sketches, and drafts can inspire new ideas and help architects to connect different pieces of information.[23] However, it can be challenging to create a single model that encompasses all aspects of a design, as different models and scales are needed to represent each aspect.[24]

According to Nollet,[25] a building starts with an idea and a drawing. Drawing in an environment. The drawing as a guide. Early and naive at first, later detailed and unambiguous. First we draw by hand resulting in an open vision.

As the project progresses, 'external' CAD drawing tools are used. In the design we use two-dimensional sketches and collages. The model serves as a three-dimensional test of what has been drawn. The detailing of the building is mapped out with precision, because on site the implementation details form the backbone of the construction file.

Mixing Specific and More Universal Design Media to Deal with Multidisciplinarity

Designers not only shift between analogue and digital, and between context and detail. They also shift between analysing and synthesising. Or in other words, between divergent and convergent thinking.

Typical media for analysis are specific and detailed. Typical media for synthesis are more general and more abstract.

The drawing and the model are both important tools in architectural design, but they serve different purposes. The model is more detailed and helps with analysis and exploration of different design options, while the drawing is a simplified representation that shows what the designer intends to create. The sketch is a type of drawing that highlights only the most relevant aspects of the design, and can be used to convey the designer's vision. Both the drawing and the model have limitations, and the designer must use each one in the appropriate way to effectively communicate their ideas. The drawing, and particularly the sketch, shows what the designer is trying to do. The medium of drawing forces the designer to draw only what is truly relevant to the design. It depicts what the designer wants to make - a potential future that will in coming cases only be depicted on paper.[26]

A diagram, compresses a lot of information about a proposition or argument into a small space. It is a visual compression that illustrates the essential insight into a single picture, a single instant. It is a general and abstract medium ideal for

23. Heylighen, *Less is More Original*, 2007, 499-512.

24. Job Floris and Teerds Hans, *On Models and Images An Interview with Adam Caruso* (Oase, 84, 2011), 128.

25. Thomas Nollet, www.tomasnolletenhildehuyghe.be, 2015.

26. Michiel Riedijk, "Architecture, Drawing, Model and Position," in *Architecture as Craft*: *Sun* (2011).

testing the coherence between investigated constraints. Many people who might find it hard to read a complex analysis of a situation can grasp it quickly in a diagram, a picture in this case being worth a thousand words. Diagrams are inevitably reductive and simplistic.[27]

A "parti" refers to the primary concept or idea behind a building. It is usually depicted in a diagram that shows the overall floor plan organization and implies the building's design and aesthetic feel. The diagram can show aspects like the building's massing, entrance, interior circulation, spatial hierarchy, relationship to the site, core location, zoning between public and private spaces, solidity or transparency, and many other factors. The emphasis placed on each factor may vary depending on the specific project. The design process is the struggle to create a uniquely appropriate party for a project. Some will argue that an ideal parti is wholly inclusive - that it informs every aspect of a building from its overall configuration and structural system to the shape of the doorknobs. Others believe that a perfect parti is neither attainable nor desirable." Use your parti as a guidepost in designing the many aspects of a building. When designing a stair, window, column, roof, lobby, elevator core, or any other aspect of a building, always consider how its design can express and reinforce the essential idea of the building. The two critical components of floor plan organization are handling the distinction between solid and open spaces and addressing circulation. In the early stages of design, consider spaces such as bathrooms, storage areas, mechanical rooms, elevator shafts, and fire escapes to be solid. These core spaces are often grouped together or placed close to one another. Open spaces, on the other hand, refer to the main program areas of a building, such as lobbies, laboratories, worship spaces, exhibit galleries, reading rooms, assembly halls, gyms, living rooms, offices, manufacturing spaces, and others. Effective floor plan organization involves creating meaningful relationships between these core and program spaces. Additionally, the circulation system should connect the program spaces, stairs, and elevator lobbies in a logical and attractive manner. Circulation should not only be functional, but it should also provide an enjoyable experience for building users through pleasant surprises, beautiful views, cozy nooks, pleasing lighting changes, and other enjoyable elements.[28]

Methodology

This paper started with a literature review to understand the strategies that designers use to deal with multidisciplinarity in architecture and specifically, the types of design media that they use during the design process. We could identify two types of design media used by designers. Specific and diverse representations used to investigate a wide range of constraints and more universally understandable diagrams and schemes used to synthesize the separate design researches.

27. David Graham Shane, "Urban Diagrams and Urban Modelling," in *The Diagrams of Architecture* (Chichester: Wiley, 2010), 80-87.

28. Frederick Matthew, *101 Things I Learned in Architecture School* (MIT Press: Cambridge, 2007).

The dichotomy found in the first part will be used in the second part of the paper to redefine an architectural design assignment as a project in phases, with the aim of helping architectural design students understand the design process better. This would enable the students to know when to make different design documents and the specific moments when they are needed.

Case Study

In a specific case, and as an experiment, we redefined the assignment for the first year architecture students of one design studio in the first bachelor. The question to design a "townhouse" was divided up into different phases, alternating research with more detailed media like drawings and models on the one hand, with more abstract and general diagrams on the other. The purposes of the different new assignments and at the same time the resulting documents, do not concentrate on a designed house as a result, but they focus on different parts of the design process.

The project was organised in a rhythm of 3 design weeks, each of them consisting of 3 design afternoons. Students worked together in a studio, whereby almost every design afternoon, a tutor passed by to review their work, individually, or in group.

Week 1: Massing the Volume in its Site

The site is a left-over plot in the historic heart of Leuven. The students were asked to carry out volume studies in combination with possible functional organisations.

The assignment started with a site visit for taking photos, measuring the surrounding buildings and recording the wider environment. This was used to make an environmental model and an analysis. In the photo analysis students defined the characteristics of the place, strong and weak. These could then act as a personal source of inspiration for the design of the house. The environmental model could be used while designing to test possible volumes for the house (Figure 2).

On the one hand, students examined in models and drawings how the program could fit into the site. On the other hand, they try to clarify an associated concept with a simple diagram (Figure 3).

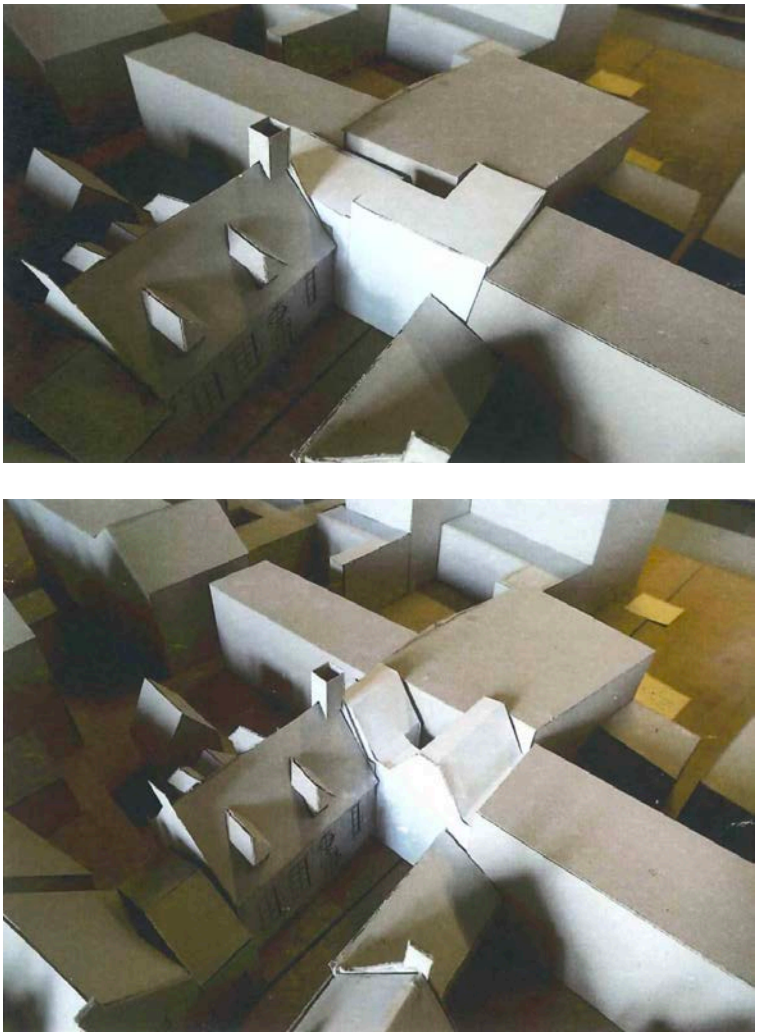

Figure 2. *Two Volume Studies on a Model by Student S.P. in Week 1*

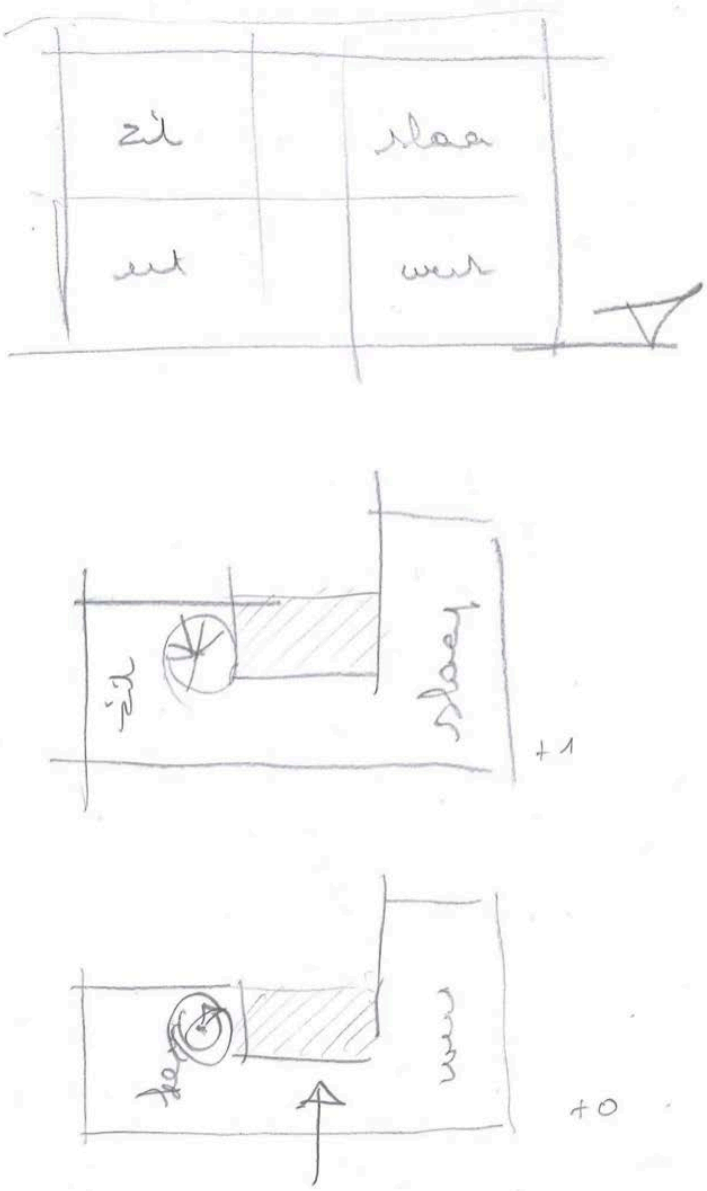

Figure 3. *Concept Diagram with Section and Plans by Student S.P., Week 1*

Week 2: Examining the Spatial Configurations and the Structure

In week 2, the students examined the interior within the volume they worked on in the previous week. Spatial configurations were tested in sketches and perspectives (Figure 4). And the structure was tested in structural plans (Figure 5). And finally, the design was also summarised in a concept diagram (Figure 6).

The objective for this week is to investigate and design the spaces and their coherence in the residential building. The research of the first week is the starting point for this.

Students investigated which qualities each space must possess, depending on the function. Qualities like scale, proportion, light, texture, and relationships with

other interior or exterior spaces were tested. All this to get to possible configurations of these spaces.

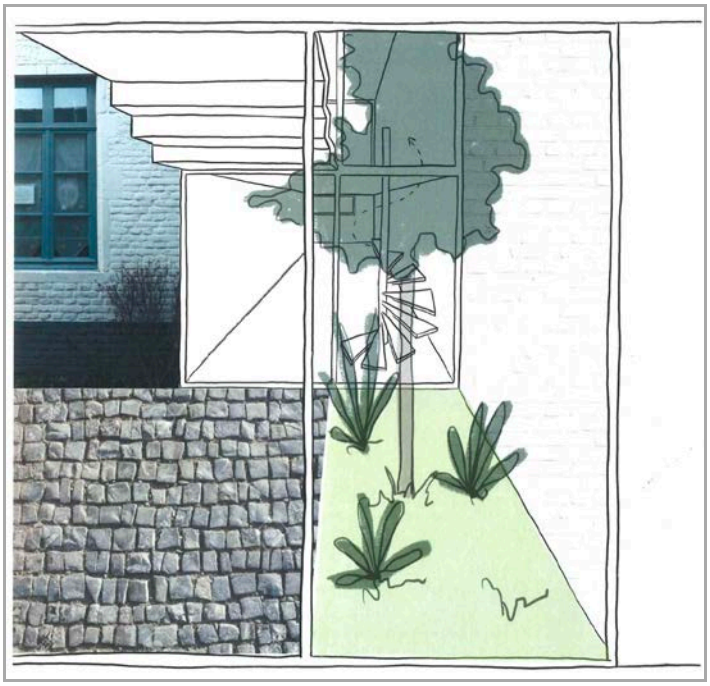

Figure 4. *Collage of Interior by Student S.P. in Week 2*

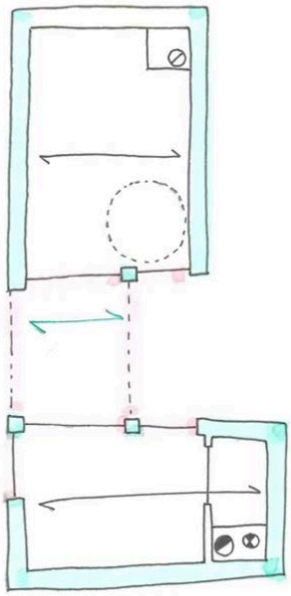

Figure 5. *Structural Plan by Student S.P. in Week 2*

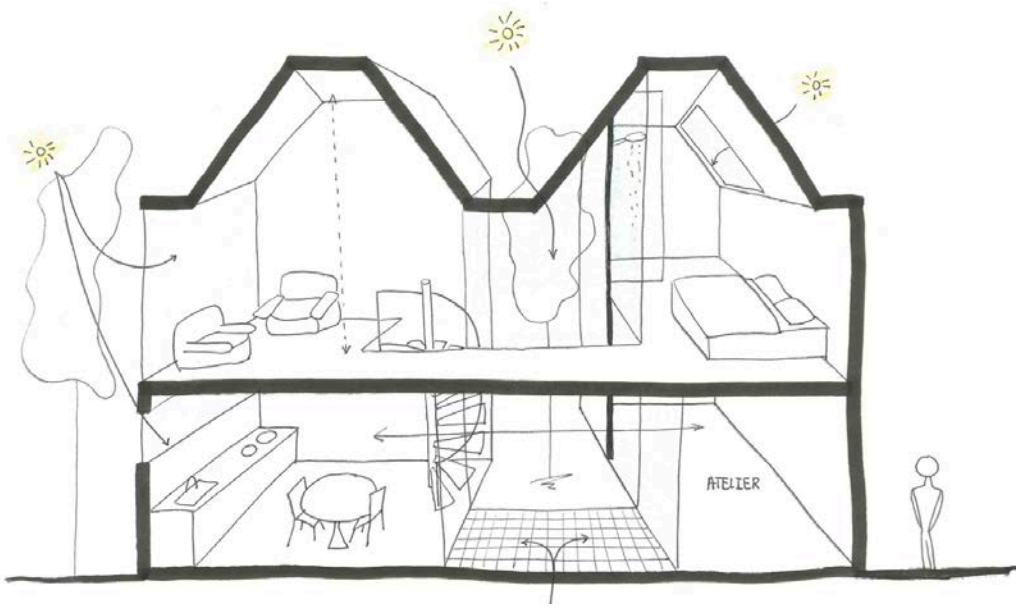

Figure 6. *Perspective Section as Concept Diagram by Student S.P. in Week 2*

Week 3: Elevation and Final Plans

In the last week, elevations were further elaborated on a model (Figure 7), and the plans were finalized (Figure 8). Different variants were examined and compared. Finally, also the concept diagram was updated (Figure 9). On the one hand, the emphasis in this week lies on elaborating the façade. On the other hand, on providing feedback and elaborating a complete preliminary design.

The starting point is again the research of the previous week, which is further refined through the themes of detailing, composition and materiality. Qualities like materials, textures, facade depths and openings were investigated. Also how the facade organises the relationship between interior and public space and how the house will be perceived from outside by others.

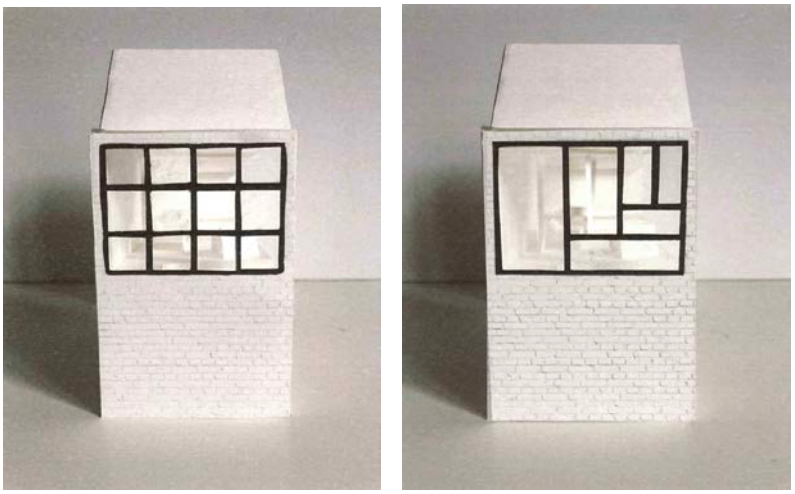

Figure 7. *Elevations on Model by Student S.P.in Week 3*

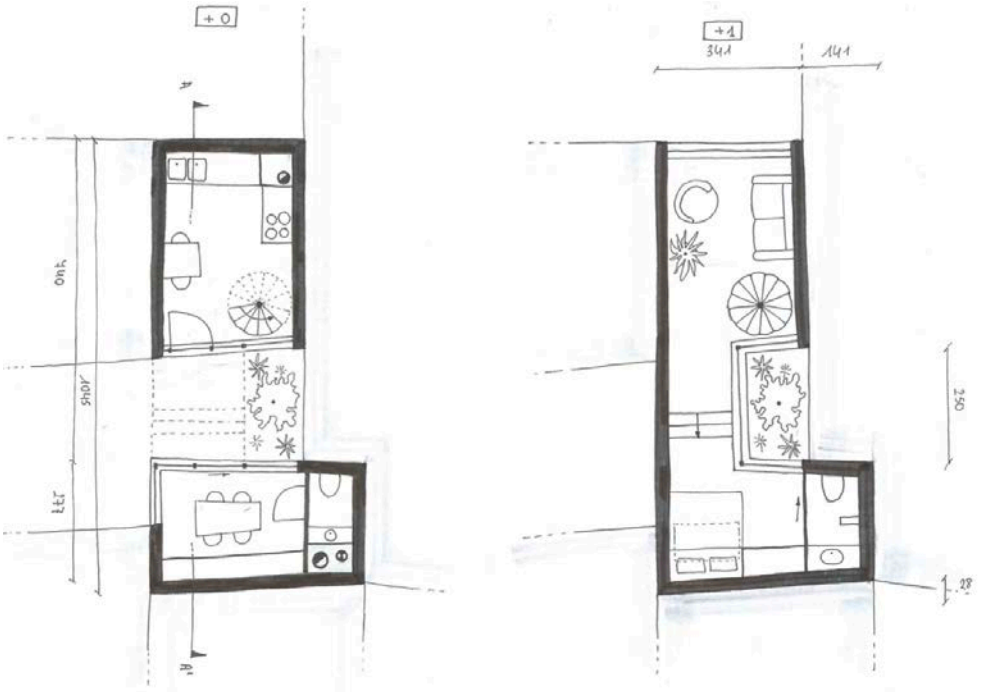

Figure 8. *Final Plans by Student S.P. in Week 3*

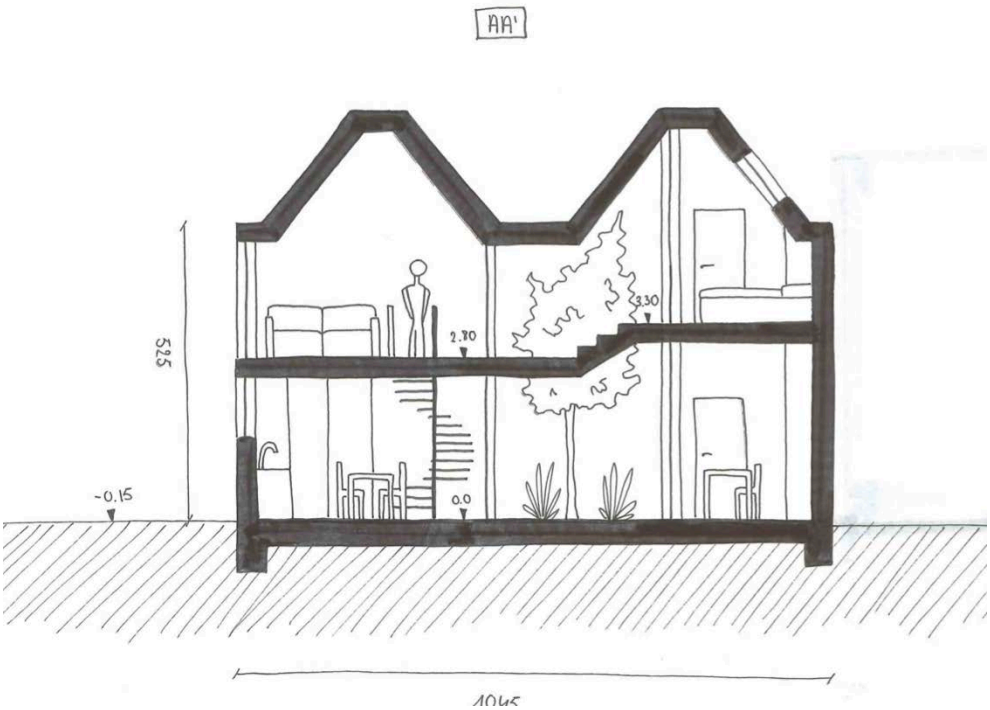

Figure 9. *Final Section as Concept Diagram by Student S.P. in Week 3*

Results

At first sight, the design research and design results seem to be similar to that of any well executed design process. And in fact they are indeed similar to an exemplary design process.

But for the students, this was different than they are used to. The definition of the assignment as a project in phases, that only at the end turned into a real design project, helped the students a lot to shift the focus away from the final result to direct it to the design process itself. It helped them to know what document to make on which moment. What to do and when. Using mainly detailed models and drawings for specific investigations.

The diagrams used to examine the concept turned out to be mainly simple sections and plans. But some students at certain stages in the design process also combined a plan diagram and a section diagram in a "perspective section diagram". Or they only used a section diagram for their concept by using some furniture indications to prevent the need for a plan diagram, thereby reducing the concept drawing to the essence of the design.

Conclusions

In literature about the design process, we could distinguish two types of design media used by architects. On the one hand, designers seem to use all kinds of different and distinct media and many different forms of representation to investigate the wide variety of constraints. And on the other, they synthesise all these investigations with diagrams and schemes that bring together all the separate design researches, and make it possible to match the results from the distinct disciplines.

Using this knowledge to redefine an architectural assignment assisted architectural students in gaining a better comprehension of the design process, enabling them to determine when to create what kind of design documents.

In architecture today, designers seem to combine specific representations, or jargon, together with more universal standard media, at the same time integrating the peculiar and the general. They mix the languages of the different disciplines in architecture together with a more universal comprehensible architectural language.

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