

The initiation to architectural analysis viewed by a group of architect teachers

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Summary: This article is about a pedagogical experience in architecture workshop teaching first-year student? at the National School of architecture of Tunis (ENAU). It focuses, in particular, on the initiation of the student to the architectural analysis process which is a major step in his course. The present work is based on a comparative study between the statements of the exercises related to the topics studied in the workshop. This comparison covers a period of eight years of teaching for the same group of teachers, and deals with their conception of architectural analysis and their way to approaching this initiation to their students. For this purpose, the Group of teachers has implemented an analysis grid that serves, to guide students in their work, and provides a good understanding of the architectural analysis as a process and brain action summoning both the senses and the mind. For this, the Group of teachers made the choice that the parameters to be analyzed concern only the geometry and topology of architectural form levels. They built their grid of architectural analysis on the basis of a postulate stating that “*an architectural project is a complex act*”. Thus, they consider the architectural project as a whole composed of a multitude of elements; a unit that draws its essence from the plurality. They formulate this complexity by the following equation:

$$\text{An architectural project} = A = 1 \text{ unit} = 1 + 1 + 1 + 1 + 1 \dots$$

Where the (1) represents the components of the project and the (+), the relationships that binds them to each other.

Introduction

In architecture workshop, learning associates the level of “knowledge” to that of the “do”. It approaches the same way, the “know-how” and the “doing-knowing”. In the workshop for first-year architecture, learning is about initiating the student to set the architectural form.

Educational brochure of the National School of Architecture and Urban Planning Tunis (ENAU) states: “The first level of architectural education is to introduce students to the reading of the architectural space through specific exercises to acquire the basic tools and fundamental concepts. It includes an introduction to modes of representation in architecture, an introduction to the perception and analysis of architectural space, and synthesizing an introduction to architectural design”.

Architecture workshop : associate two levels



Our teaching approach can be summarized by the table below:

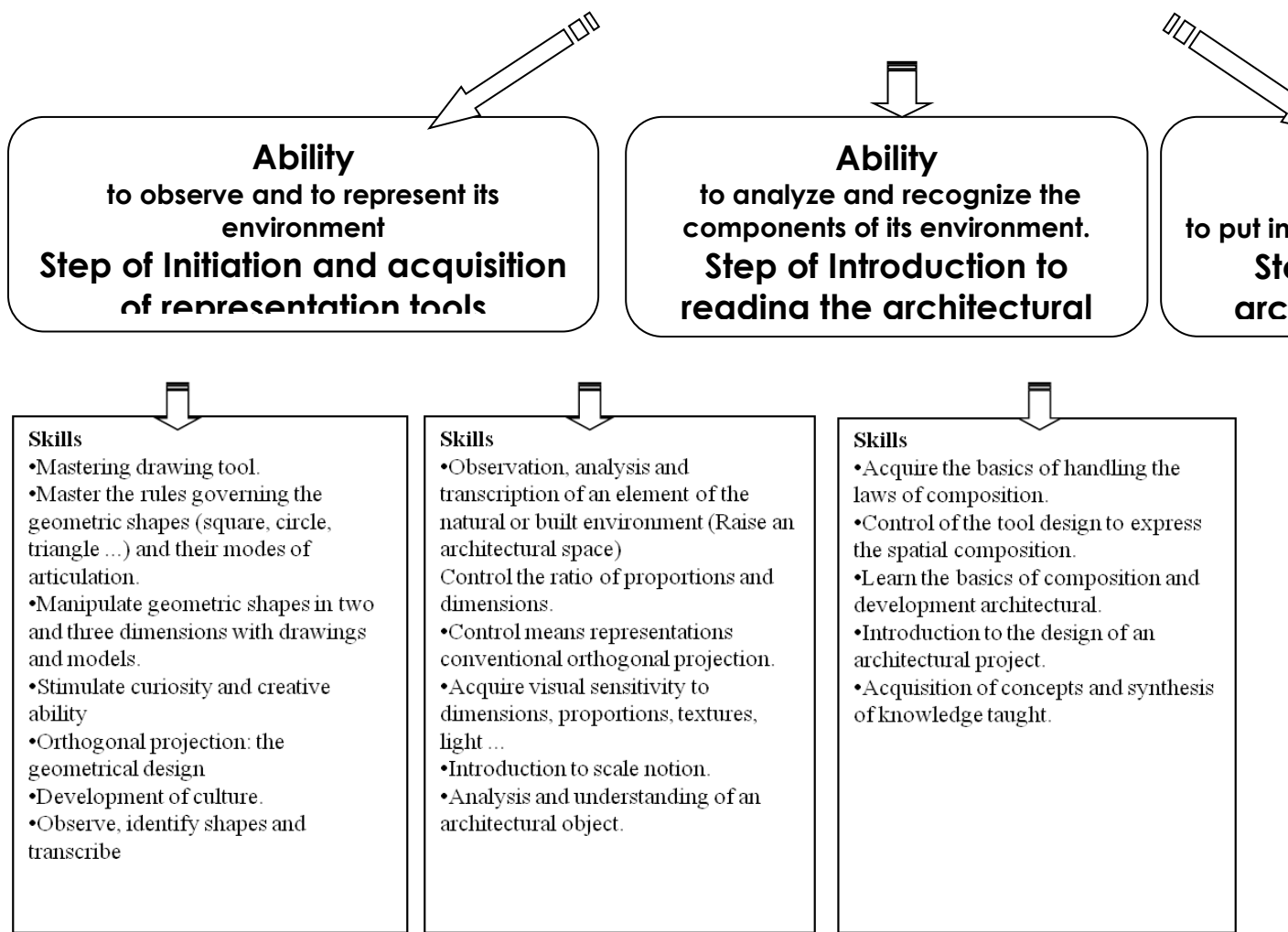


Figure 1: Architectural teaching approach for first level studio

This article outlines the evolution of an educational approach for initiation to architectural analysis, through a comparative study of statements of the exercises performed in first-year architecture workshop, and this for the same group of teachers. This study pertains to a period of eight years, starting from the academic year 2006/2007 until the present year 2013/2014. The comparison will involve three elements of the statement of the exercise, namely: introduction, educational objectives and subject. It should be noted that all statements called, in this study, correspond to the same textual structure shown in the following table:

Academic year..., date	Title: Architectural reading (analysis of architectural works)
Introduction:	
Objectives:	
Subject:	
Work involved:	
Render:	
Evaluation criteria:	
Teaching materials:	

Figure 2: Exercise's statement model for first level architectural studio

Our work is divided into three parts. The first describes the evolution of our approach in the initiation to the analysis of an architectural work during the study period. The second relates to the educational tools that we make available to our students as they begin their initiation. The third part is a summary and attempt at modeling our teaching approach for the initiation to the analysis of an architectural artwork.

1 - An evolutionary approach and a continuous questioning:

The evolution of our approach to the exercise of architectural analysis is part of the problem of initiating students to the architectural fact in its complexity. The question that we asked ourselves has always been how to explain this complexity to first-year architecture students, in a simple and direct way?

We present their architectural object as a set of elements and parameters associated, combined, intertwined, added together and composed, giving rise to a **Unit** called the artwork or architectural project. In response to our question, we made use of a simple mathematical equation with several parameters:

$$\boxed{1 + 1 + 1 + \dots = 1}$$

At first we thought it was better methodologically to restrict the Initiation to the architectural analysis to formal analysis, and we explained to our students that this restriction was referred to as the simplification of their task. We insisted on them about the fact that the parameters involved in the architectural composition were varied and numerous. We explained that this composition satisfied the rules and principles which are none other than the "+" of the equation. These principles govern the assembly of shapes which are represented by "1". "1" is

the final architectural work that summarizes the choices made by the designer, and thus we introduce the concept of "architectural design".

In architecture "compose" means organizing forms according to the principles and laws of composition that originate in classical architecture (symmetry, hierarchy, axiality). Analyze an architectural work is to observe, describe, decompose, and unravel in order to understand the principles of composition and the choices of the designer. With time, the restriction to formal analysis confronted us with problems in corrections. Our students, not even focusing on the formal composition or geometric level of the architectural object analyzed, touched other parameters of the architectural composition.

We had to find answers to questions like: can geometry alone help us apprehend the architectural space in all its complexity? What qualifies an architectural shape? How to help first-year student to seize the transition from geometrical shape to space? In fact, we reduced the vision of the student of the architectural object to a purely geometric composition, and thus we limited his initiation to the concept of architectural space. We realized that we had to revise our pedagogical approach of this exercise. To further explain the complexity of the architectural fact our equation announced above becomes:

$$\text{Architectural project} = \text{a composition of elements} = \text{one unit} = 1 + 1 + 1 + 1 + \dots = \mathbf{1}$$

Thus the complexity of the architectural fact is more evident. The objective of the analysis is not to retrace the design process of the architectural artwork but rather to allow the student to build a hypothesis composition and engage him in mechanisms of reading, decoding, differentiation and recognition. The geometric shape is certainly an important composition parameter, but cannot ensure the learning expected through this exercise alone.

We consider the analysis as a sequence of operations for identifying and decoding the manufacture of architectural space. It is a **process** in itself. We then approach the analysis of transitional spaces (indoor/outdoor, open/closed, and internal/internal, up/down) to enable the student to understand the devices that materialize them, and so put them in relation to their different qualifications by studying them both in their shape in plan, elevation and volume. This setting is realized by the study of proportions which derives from the quantification of space. The same work is done to the limit **of** and in **the** space. It should be noted that the

concepts discussed mainly refer to the topology, although it is also about geometric concepts and scale or rather proportions.

The fact to bring back the result of the analysis or playback of an architectural artwork to a combination of three levels: shape, space quantity and limit, allowed us to address, with our students, architectural artwork in its complexity and its three fundamental levels, namely:

1. The geometric level
2. The metric level
3. The topologic level

This tripartition presented by Dominique RAYNAUD in his book “architecture comparée, essai sur la dynamique des formes, Editions Parenthèses”, resumes the whole work of Jean PIAGER on the construction of the space itself inherits from the division that is practiced in mathematics between topological, projective and Euclidean structures. It uses all the three levels discovered by architectural morphosyntax by COURTIEUX, g. (La conception architecturale: éléments théoriques et techniques dans le cadre des procédures assistées par ordinateurs, Paris, Rapport de recherche CORDA-DGRST, 1976)

This decoding on three levels is a horizontal reading that leads the student to detect the passage of both geometric and metric tools to the topological level and introduces him to a big question: **How do the shapes become space?**

At this moment, our thinking leads to the development of an **analysis grid** that presents itself as a canvas and a guide for the student in his work.

It is noted that for the first stage of the period covered by this study, an introduction to the architectural analysis was based on graphic and written documents. Exercise racks projects were well documented but not, necessarily, well-known or widely publicized.

Our group takes the decision to analyze projects that students can visit and discover, because they were conscious of the importance of the **lived** dimension to increase the sense of observation of the student's first year. We change not only the pedagogical approach but also the way to introduce it. We explain to the students that their introduction to architectural reading will be done according two approaches in close correlation:

- **A geometric approach** : The space is reduced to a virtual concept with *geometric abstraction*, therefore we study the geometric shapes at the levels of the plan,

elevation (cuts and facades) and the volume, in terms of geometric properties and laws of composition.

- **A topological approach** : Space is essentially a “*space lived*” through consideration of the user in the fulfillment of the program of action " *visit and know an architecture.*” It comes to studying the devices enabling the transition from one space to another.

Visit the support for the exercise of work analysis, engages the student in the appreciation of the experience of limits as a topological value manifested either by mechanisms of transition modes of articulation from one space to another. This experience stimulates his perception and develops his ability to decode the space where he evolves. It allows him to qualify it in determining the components (spatial entities) and to identify **transition devices**, likely put in relationship with one other.

To clarify the evolution of our approach to architectural analysis we present the evolution of the educational objectives of our exercise. During the first study period, educational aims are primarily:

- Recognize the properties of different **geometric shapes**.
- Stand out the various **components of an architectural artwork** (square, circle, triangle, point, line...).
- Understand the **systems of arrangement and articulation** of the various components defining **the formal architectural concept** (master ideas).
- Make choices among various modes of representation (plan, elevations, axonometric, croquis...) and various materials expressing the better **analyzed laws**.

These objectives have seen their contents change during the second period of the study, but about keeping certain constancy. They are as follows:

- Recognize the properties of **geometric shapes, their agencement modes** as well as **their different interpretations** in **plan, elevation and volume**.
- Recognize the **transition systems** of one space entity to another as well as **devices that materialize them**.
- Identify **spatial limits, qualify** and understand their **modes of articulations** as well as their **materializations**.
- Make choices and decisions at the individual level and at the level of the Group (relative to the content of the work, presentation and his organization).

- Working in a group: be disciplined, consult, listen to, convince, argue and decide together.

For the third and last period of our study, the educational objectives are summarized in four points:

- Recognize the properties of geometric shapes, their **layout modes** as well as **their different interpretations in plan, elevation and in volume.**
- Recognize the **devices of transitions** of one space entity to another as well as **devices that materialize them.**
- Make choices and decisions at the individual level and at the level of the Group (relative to the content of the work, presentation and his organization).
- Working in a group: be disciplined, consult, listen to, convince, argue and decide together.

In order to better understand their evolution we set up the following table:

Educational objectives	Number	Similarities	differences
1 ^{er} period	4	* Recognition of geometric shapes * Operation of the choice	* Inventory of geometric shapes
2 nd period	5	* Recognition of geometric shapes * Operation of the choice	* Elimination of the 2 nd objective * Speaking of modes of combination of geometric shapes and their interpretations at the level of the plan, elevation and the volume * Evoke transition systems and devices that materialize them * Speaking of spatial limits and their qualifications * More precision at the level of the choice made * Speaking of the Working Group and its progress
3 rd period	4	* Recognition of geometric shapes * Operation of the choice	* Reformulation of the 2 nd objective: talk about transitions rather than transition systems devices. * Elimination of the 3 rd objective where it is question of limits.

Figure 3: Comparative table of pedagogical objectives

This development relates to a review of educational priorities and an evaluation of the results obtained in each of the time periods listed. It is clear that two constants characterize all of the statements at the level of their pedagogical objectives. It is an action of identification of geometric shapes and operation of the choices that are divided into individual and group ones.

This exercise takes place in two stages: individual work and group work. Group work is specified by listening, dialogue and taking joint decisions. It is seen as a full **process**. An intervention on this subject is presented to students to explain why the group work is considered as a process, what are the different stages that constitute this work, how should it be controlled and what are the indicators of the proper conduct of its operations.

Regarding the third element of the statement, as we know the subject of the exercise, it includes a detailed explanation of the analysis grid and presents the three steps that it must satisfy:

1. **Decomposition** of the whole in components.
2. Identification of the relationship between the component parts (**laws of composition** and **modes of spatial articulation**) and presentation of the process map.
3. Interlinking of the components through the laws of composition and patterns of joint space to approach the way that the architectural object has thought and present a **hypothesis of composition**.

Also, the subject states that analysis will be in two dimensions (plans, sections and facades) and three-dimensions (axonometric, perspectives, analytical models,...) and it will be confined to the **two levels: geometric and topological**. We present you the definition of these two levels as it was presented in our statements:

- **Geometric analysis** is the component parts (points, lines, simple geometric shapes, simple volumes...) to detect the laws of composition for the study work.
- **Topological analysis** is to :
 - Determine the components (spatial entities) and identify **transitions devices**, apt to link two spaces of opposite or different qualifications (cover indoor/outdoor, open/closed, wide/narrow, up/down, static/dynamic, dark/illuminated, / discovered...).
 - Formally studying the transition devices at the level of the plan, elevations and the volume and see their impact on the spaces they delimit (logon mode, degree of transparency and opacity, thickness,...).

The subject of statement specify at the level of geometric analysis that a composition law allows us to understand what we analyze. It helps us answer the question: **what is it?** Whereas a “modus operandi” of spatial articulation allows us to understand how the Act that we detected took shape. It responds to the question: **how?**

2 - Teaching tools from initiation to the architectural analysis:

2.1 **The grid analysis** : It is a canvas that we ask students to follow. We consider that it is a tool that allows students:

- To facilitate their task since it defines what they are accountable to.
- To learn about the analysis of architectural artwork.
- To learn to work methodically.

We believe that **grid** of analysis which we elaborated presents to students a method of work and a way to 'do'. We present below our grid model:

Formal analysis	Analysis of the transition spaces	Analysis of the limits
Recognizing the enveloping shape in plan, elevation and volume and defining their articulations.	Identify areas of transitions and classify them (transition interior/exterior, internal/internal and up/down)	Recognize the limits and list them.
Detect the structure hidden of plan, elevation and volume: determine the formal components and their articulations.	Study them formally at the level of their plans, their elevations and their volumes: in terms of components and articulations.	Qualify these limits and see their impact on the spaces that they delimit (openness, transparency, opacity, thickness, continuity, transgression...) and the types of links that they generate.

Figure 4: Architectural analysis grid

2.2 **Map of the process:**

For our group, the analysis, as a cerebral action summoning both the senses and the mind, is a process. Is a sequence of operations leading to a result. Being convinced of this assumption that owes its origins to a qualitative approach to education, we provide students a template of the analysis process. We ask them to map their process of analysis both at the level of their individual work than their group work. We present the latest version. This model refers to the group work. For the individual work model, we simply eliminate the last column which defines the head of the carried out operation.

What is it?	How to materialize it?	What should I use to express it?	How will this expression be achieved?	Who will do it?
Rules of composition	“Modus operandi” of spatial articulations	Technique of expression	Means of representations	The task leader
Linear	Juxtaposition and repetition (illustration)	Plan and elevation (illustration)	Gluing and coloring (illustration)	Mohamed
Symmetry	Repetition and frame (illustration)	Axonometry torn	Pencil with a gradient of values (illustration)	Alia
Centrality	Radiation centrifugal (illustration)	Axonometry and plan (illustration)	Watercolor (illustration)	Emna
Axiality	Two major axes: 2 axial planes (illustration)	Plan and elevation (illustration)	Collage and low relief (illustration)	Saïd

Figure 5: Analysis process map (group work)

Map of the process of analysis is a tool that summarizes the various stages of the work. It enables their visualization, their organization and their follow-up.

3 - Conclusion:

Exploration of the concept of analytical reading of an architectural artwork is a key moment in the learning of architect students. In this context, our teaching approach adopted the principle of the analysis of an architectural work as a process. This approach provides both a coherent reading pattern of the first moments of the architectural project and a reflection of broader scope on the mechanisms of production of architectural space.

The exercise of analysis is for the student, a tool for the construction of a framework of references and architectural culture, to switch on the writing architectural process or introduction to put in shape an architectural object. Our look, to the architectural **introduction analysis** can be understood theoretically under this model:

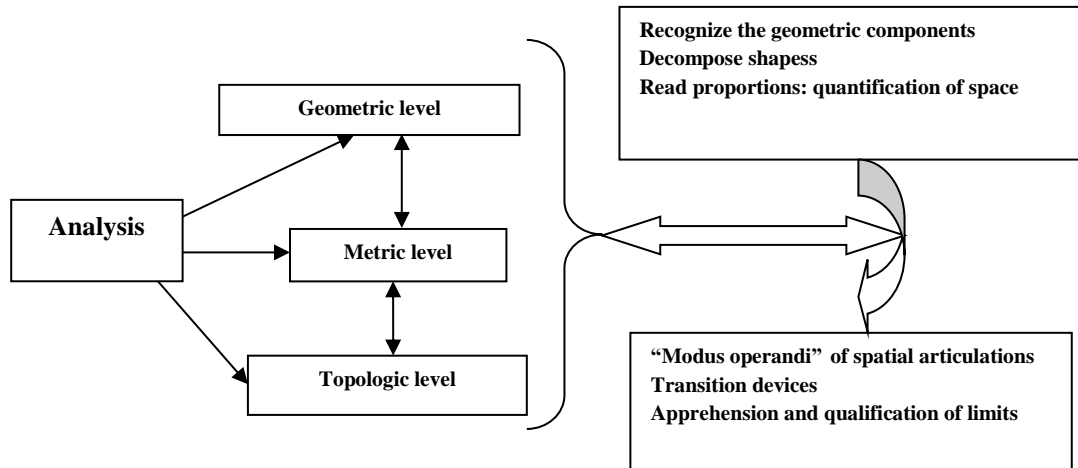


Figure 6: Architectural introduction analysis model

An introduction to the architectural analysis approach is seen as a process around multiple operations **decomposition and segmentation of the architectural artwork**. These operations use the same tools of representation of the project: (graphics elements, models...) and to allow the student to build its own analytical reading (identify, compare and differentiate) and propose a **hypothesis of architectural composition**. Modeling of this process can be as follows:

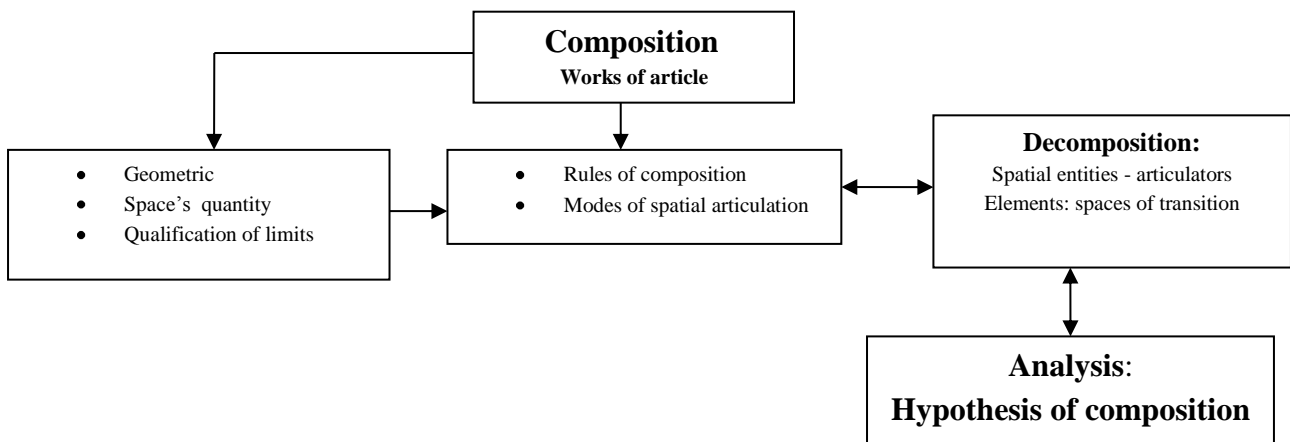


Figure 7: Analysis process

Through this study, we see how changing pedagogical and methodological approach of the architectural analysis exercise, shows, under apparent linearity of the formal composition of architectural space, it hides a conceptual revolution that makes us go "from a closed order to

an open order” of architectural space. (cf. JACQUES Lucan, *Composition, non-composition Architecture and theories, 19th-20th century Presses polytechniques and universitaires romandes 2009*).

Thus the attachment to the geometric construction, reflecting an equation linking shapes according to rules and laws, until the notion of "composition is questioned"(d'un ordre fermé à un ordre ouvert), is now neglected, although “ escape completely from the composition is an action endless if not impossible ” (S'échapper absolument de la composition [soit] une entreprise interminable sinon impossible). In this same order, the topological level, which has its source in the **complexity of the architectural fact** wins, rightly, the place in our approach, thus putting **the notion of space** in the foreground.

To sum up, an introduction to the architectural analysis is intended to serve our ultimate objective, which is to introduce the first level architecture student to putting in shape an architectural object. **To what degree our approach, outlined in this article, has helped us achieve this?** This question will be the topic of our next article.

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