URBANISM FROM A MORPHOLOGICAL STANDPOINT:

A TEACHING EXPERIENCE

URBANISMO DESDE UNA APROXIMACIÓN MORFOLÓGICA:
UNA EXPERIENCIA DIDÁCTICA

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The first course in Urbanism at the School of Architecture of Alcalá is organized in two related parts, theory and practice, and introduces students to urban design and planning. On the one hand, students acquire a solid, yet incipient, theoretical knowledge and, on the other hand, they start designing projects in the city. Both tasks are part of a morphological approach that inherits some methods from Manuel de Solá-Morales' Laboratori d' Urbanisme de Barcelona and some from the Italian school.

The theoretical part is subdivided into two segments. First, the main concepts of the morphological approach are presented to students, who are then exposed to a brief history of the traditional city and its urban form, from the Pre-industrial era to the urban renewal in the 1970s.

The practical part includes both analysis and proposal. The analysis deals firstly with the structural scale, framing a site through different inquiries; secondly, it looks closer at diverse morphological aspects. In the proposal, students use that second morphological scale to create designs through the categories previously studied. Lastly, students propose some graphic urban rules at the typological scale.

The paper establishes links between the course exercises and professional practices and concludes with in-class opinions and results.

Keywords: Urban design, Morphology, Teaching

El primer curso de Urbanismo en la Escuela de Arquitectura de Alcalá está organizado en dos partes relacionadas, teoría y práctica, e introduce a los estudiantes en el Diseño y el Planeamiento Urbanos. Por un lado, los estudiantes adquieren un conocimiento teórico, todavía incipiente mientras, por otro lado, comienzan a proyectar en la ciudad. Ambas tareas se realizan mediante una aproximación morfológica que parte de métodos heredados tanto del Laboratori d'Urbanisme de Barcelona de Manuel de Solá-Morales, como de la escuela italiana.

La parte teórica se subdivide en dos segmentos. Los conceptos principales de la aproximación morfológica se presentan primero a los estudiantes, quienes después aprenden una breve historia de la ciudad tradicional y la forma urbana desde la era preindustrial a la recuperación urbana de los años setenta del siglo XX.

La parte práctica incluye análisis y propuesta. El primero se inicia a escala estructural a través de diversas indagaciones y a continuación se enfoca en diferentes aspectos morfológicos. La propuesta se desarrolla en esta segunda escala morfológica, empleando las categorías previamente analizadas. Finalmente, los estudiantes proponen una serie de normas urbanísticas a escala tipológica.

El artículo establece vínculos entre ejercicios de clase y prácticas profesionales, y finaliza explicando las sesiones críticas y algunos resultados del curso.

Palabras clave: Diseño urbano, morfología, enseñanza

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INTRODUCTION

The subject of this paper is "***Urbanística I***", the first course in Urbanism at the School of Architecture in the University of Alcalá. The university is located in Alcalá de Henares, a World Heritage City to the east of Madrid and the third most populated city in the region after the capital. The School of Architecture of Alcalá is one among the three dozens of schools of architecture in Spain, a quarter of which are in the region of Madrid. Every year, about a hundred students enter this program, which means Alcalá has an average size among the schools in Spain, but is small when compared to the larger schools in Barcelona or Madrid, that have three or four times that number of students per cohort. Despite the recent increases in public tuitions, Alcalá is still among the most affordable schools of Architecture in Madrid.

Like all other architects in Spain, those from the School of Architecture of Alcalá are entitled to work professionally directly out of the school, when they graduate after completing the five-year degree and a final project. Some schools offer master´s programs in urban planning, urban design, or landscape architecture, but in Spain degrees in these subjects hardly exist. As a result, some argue that strictly speaking, there are no such professionals, but rather architects with specific expertise.

The process of adapting to Bolonia –a recent European educational framework- has brought several changes to the schools of architecture in Spain. There is now a plethora of different courses within all the schools. However, most schools still share a small number of areas or departments under which almost all the courses are to be found. In Alcalá, these areas are the following: Composition, Construction, Graphic Expression, Projects, and Urbanism. The area of Urbanism in Alcalá includes two subjects: Landscape, and Urban Design & Planning, the latter being the most relevant for this article. In the transition from the old to the new plan of study, there have been changes in both the courses and the workload offered in Urban Design & Planning. In the previous plan, there were three compulsory courses at the core of the degree, equally 27 Credits. In the new plan, there are four shorter, compulsory courses that start later in the degree and account for 24 credits in the European Credit Transfer and Accumulation System (ECTS) (see Table 1). The first course in Urbanism is "Urbanística I" (6 ECTS), that is currently undergoing some changes in its configuration and contents. The following is a proposal for this course that adapts some aspects from previous courses in the area, but at the same time tries to develop a coherent structure of its own.

Previous Plan of Study

Course	Year	Credits
Urbanística	2nd	9
Urbanismo I	3rd	6
Urbanismo II	4th	12
Total		27

Present Plan of Study

Course	Year	ECTS
Urbanística I	3rd	6
Urbanística II	4th	6
Urbanística III	5th	6
Urbanística IV	5th	6
Total		24

Tabla 1 ÁCompulsory Courses in Urbanism. School of Architecture of Alcalá (Source: E. Ontiveros, J. Malo de Molina, from www.uah.es/estudios/grados)

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TEACHING URBAN DESIGN AND PLANNING FROM A MORPHOLOGICAL STANDPOINT

As with all courses within the Urbanism Area at Alcalá, "***Urbanística I "*** is organized into two related parts -theory and practice- and revolves around the urban project. This course specifically aims to introduce students to urban design and planning. On the one hand, it exposes them to solid, yet incipient, theoretical knowledge and, on the other hand, asks them to start designing projects in the city.

The program and structure of all courses are established by the Chair of the area, a post designated through an open and competitive selection process. In this case , the pedagogical path represents a commitment to an educational line that places a greater emphasis on morphological aspects than on planning features, thereby reflecting the distinct approach to urbanism in architecture versus urbanism in other disciplines such as geography, engineering, sociology, economics, etc.

THEORY

The theoretical part of the course is subdivided into two sections that deal firstly, with the urban concepts with which the students will work in the practical part of "***Urbanística I"*** and secondly, with a starting vision of the history of the urban form.

MORPHOLOGICAL CONCEPTS

This section explains the main morphological concepts that students will use in the practical part of "***Urbanística I***". Three lessons introduce them to the main scales on which the morphological approach is carried out both in terms of urban analysis and design.

The first scale is that of the city-district and its general urban structure, which is understandood from the categories of Topography, Networks and Mosaics, with special emphasis in the latter two. On the one hand, Networks deals with the systems of dynamic components that constitute, organize, and support continuous flows in the city. On the other hand, Mosaics includes those other more static components such as the differently recognizable pieces of urban tissues.

The second scale introduces three basic components and processes in the study of the urban form: Urbanizing, Parcelling and Building (U,P,B). As Manuel de Solá-Morales (1980) has shown, studying these elements and their different timings, one can better understand the forms of urban growth.

Last but not least, the third scale presents the notion of the architectonic type. The development of this concept is followed by tracing its evolution in history, from the 18th century to the second half of the 20th century, covering the notions of singularity and reproducibility associated with it (Moneo, 1981).

INTRODUCTORY VISION OF THE HISTORY OF URBAN FORM, THE TRADITIONAL CITY FROM THE PRE-INDUSTRIAL ERA TO URBAN RECOVERY IN THE 1970S

This second section is structured chronologically in three main sections: the Pre-Industrial City, the Hispano-American City, and the Urban Renewal.

Concerning the Pre-Industrial City, the course first introduces some definitions about historic centers and the role of technology and social organization in the birth of urban civilization. After that, there is an explanation on the origins and evolution of the city, including the thesis of Sjoberg (1988) and the civilizations in the Fertile Crescent, and in the valleys of the Nile, the Indus, and the Yellow River, as well as briefly covering Mesoamerica and the Andes. This section includes a lesson on Spanish preindustrial cities, from pre-Roman times to the Baroque, including three case studies: Madrid, Alcalá and Bilbao.

The Hispano-American City section overviews some Hispanic foundations in America relating them to the Laws of the Indies, and covering some examples of city grids and main squares. The section also traces the historic evolution of some Hispano-American cities into their contemporary condition, emphasizing aspects of their urban layouts and parcel mosaics, following texts like Terán (1989).

With regards to the Urban Renewal section, it uses several references like Morris (1979) and Sica (1981), and begins with some aspects of civic culture and urban embellishment, as reflected in the opening of roads and squares, the Rome of Sixtus V, or the Spanish plazas. The second part of the section

3 Daniel Zarza, full professor, is the current Chair of the Urban Area and, together with the first associate professors of the Area (Manuel Aymerich, Fernando Fernández and Eduardo de Santiago) implemented this pedagogical approach in Alcalá after his previous academic experiences in Madrid, Alicante and Granada.

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Figura 1 Some reference books regarding the theoretical part of the course

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covers the functional reforms such as the demolishing of the old city walls and their replacement by traffic rings (i.e Wien and Barcelona), the Hausmann interventions in Paris, the opening of Regent Street in London, and some"***Gran Vía***" in Spanish cities. The following lessons include the post-war urban reforms, with the development of the City Business District, the discussions on public and private transportation, as well as the ring roads and parking systems. The course ends with the urban renewal of the 1970s, bringing in the pedestrian areas and the social housing issues with the example of Bolonia.

PRACTICE

The Practical part of "***Urbanística I***" is structured around two sets of exercises, an analysis and a proposal. Both sets cover three distinct scales involving different processes and agents. Most of the exercises are in groups, but some tasks have to be completed and delivered individually.

STRUCTURAL, MORPHOLOGICAL AND TYPOLOGICAL ANALYSIS

In the first set of analysis, students address the structural scale, with an approximate detail of a 1:20.000 map. The groups are asked to frame the site of study into its bigger surroundings through separate Topographic (T), Network (N), and Mosaic (M) inquiries, but also to offer a holistic Synthetic (S) view of the area. For each T, N, and M category, groups present a general plan and a related set of a minimum of three detailed sections or examples that explain the different qualities of the place.

Regarding the Synthetic view, the location of the practice is chosen so that at this scale, students' work can display a clear understanding of a historical center, some area linked to the industrial revolution, and a new neighborhood. The students are asked to research and graphically display the relations among those three times and spaces.

The second analysis takes a closer look at the site, with the detail of a 1:2.000 plan. At this scale, the groups examine the area through the three processes and morphological aspects of Urbanizing (U), Parcelling (P) and Building (B). The clear and operative distinction between these categories is inherited from the works of the Laboratori d'Urbanisme de Barcelona (LUB) under the direction of Manuel de Solá-Morales, which are well explained in his 1997 text. As with the previous structural scale, apart from a specific plan and three detailed aspects for each of the U, P, B categories, the students are asked to build a Synthetic view displaying an understanding of the qualities of the site.

In the third and closer analysis, each student examines the typological aspects of at least three typical buildings in the area. Apart from the facts and figures present in the local urban codes and residential stipulations, a special emphasis is required from each student to graphically reflect the relations of each selected building with its plot and the street, thus linking this last analysis to the previous UPB categories. To help with these tasks, the three following texts: Berghauser (2004), Lehnerer (2009), and Esteban (2003), proved to be especially useful (see Figure 2).

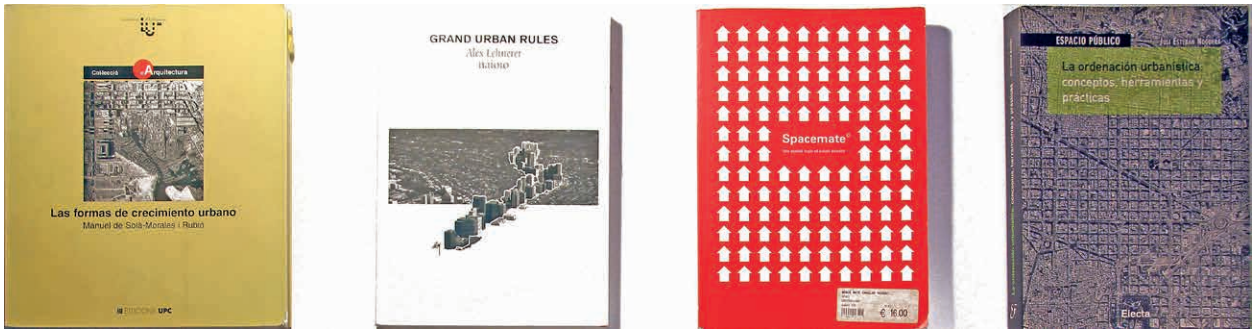

Figura 2 Some books for the analysis in the practical part of the course

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URBAN DESIGN AND URBAN RULE PROPOSALS

Following the analysis, the proposals make use of two of the scales previously used by the students both in groups and individually. The first proposal is made in groups and deals with the structural and morphological scopes. It usually consists of the development of an urban design dealing with the different tissues present in the area. For practical purposes, most of the exercise is carried out at the 1:2.000 scale, previously analyzed and framed in more detail. Nevertheless, the groups are asked to test and link their proposals to the larger scale, where they usually find some keys for their designs. The submitted work may range in quality and intensity, but they must be presented displaying the same categories used in the analysis. This way, Urbanizing, Parcelling and Building (UPB) overcome their strict definition as processes and morphological aspects, and become design tools. Last but not least, students are individually asked to propose a set of graphic urban rules, getting down to the typological scale. They have to project three examples of possible buildings adapted to those new urban rules in relation to the existing fabrics, showing how the design follows the regulations and fits into the place.

STRUCTURAL AND MORPHOLOGICAL ANALYSIS AND SOME OF THEIR PROFESSIONAL IMPLICATIONS

The uses for the course's practice outside the class can easily be verified through a brief review of some of the elements present in the academic exercises and their corresponding professional value.

STRUCTURAL ANALYSIS

Concerning the **Structural Scale Analysis, the topographic study** includes identifying and representing contour lines with their values, ridges, troughs, etc. These basic aspects are fundamental to understanding the flow of the water in the ground, the orientation and slopes of the terrain, etc., which are frequently used professionally to establish proper locations for settlements that are safe from flooding, and not too steep.

In **the network analysis,** students display the different transport channels considering their hierarchies and physical presence in the studied area: roads, pedestrian and cycling paths, train/tram networks, etc. This is commonly used in offices to establish the mobility and accessibility patterns of a site and serves many different purposes, from the basics of showing the location of a place regarding its position to its surrounding networks, or the time required to travel from a relevant infrastructure node such as a station, port or airport, to the more intricate analysis of Space Syntax and the likes

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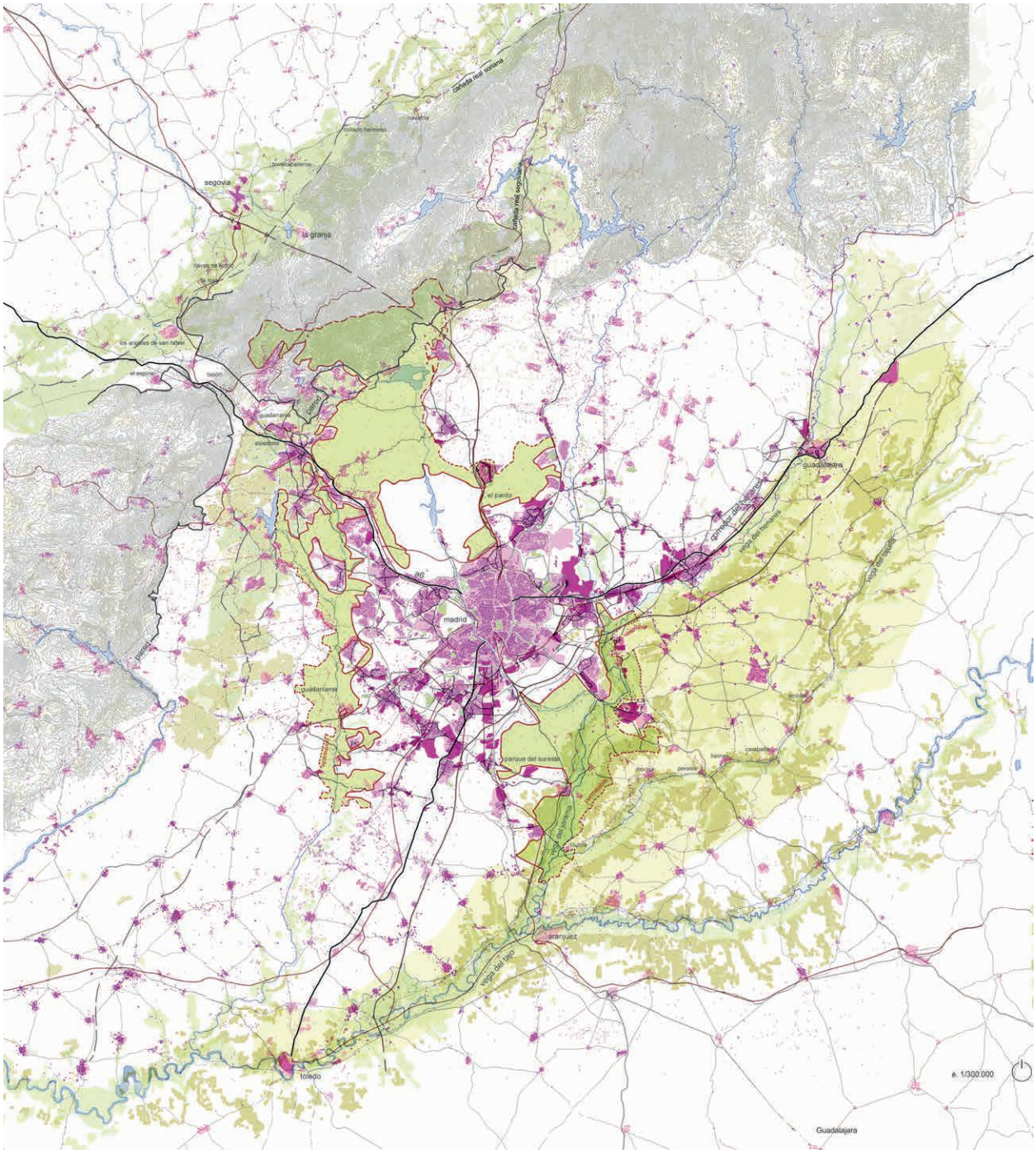

Figura 3 "A new urban scale to depict the Region of Madrid. A structural analysis of the territory of Madrid, framed by Guadalajara, Toledo and Segovia, in the context of rural and natural landscapes". Students' work by Javier Serrano, Pablo García Mena y Jose Estebaranz. School of Architecture of Alcalá.

Figura 4 Structural analysis and development timeline for the Region of Kuala Lumpur emphasizing its network connections. Work by Jose Estebaranz for Fundación Metrópoli.

The mosaic analysis involves examining both morphologically and historically the built up areas of the location. The students check the grain and regularity of different urban tissues, using chronological criteria as well to display the evolution of the area. Professionally, this is used to recognize and express the diversity of a place and to check the harmony between a proposal and an existing area.

The synthesis challenges each group to present the area in a clear and distinct way that helps to explain the site in its present state. For the sake of clarity and legibility, instead of showing all previous analyses together, students usually have to critically sacrifice some aspects of the topographic study and a few features of the network and mosaic analysis. Therefore, the synthetic analysis displays the take of each team on the area, and it is usually the work that differs most between teams.

Figure 4 and Figure 5 provide a visual example of the practical use of the learnings from the Urban courses with regard to the professional world. Figure 4 shows the work of a group of students from the School of Architecture of Alcalá -Javier Serrano, Pablo García Mena y Jose Estebaranz- who have continued their careers in the field of architecture and urbanism. As shown in Figure 5, the office work of Jose Estebaranz, makes good use of the lessons learned in the urban design and planning courses, which provided a solid baseline for an innovative and creative development in the professional environment.

MORPHOLOGICAL ANALYSIS

As it has been previously described, the **Morphological Scale** is employed both in analysis and proposal. Given the required length of this text, the Urbanizing, Parcelling and Building categories are reviewed here only in the light of analysis, leaving their instrumental use in proposals for a future article.

The Urbanizing analysis is used by professionals to identify and represent different components of the public space. Given the 1:2000 scale of the analysis, the depicted elements include roads and sidewalks, bike lanes, surface parking, trees, etc. This method makes it possible to develop an ability to recognize and display the diversity of public places and their features, and helps to acquire a sensibility that becomes a very helpful tool. This

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category also plays a key instrumental role in establishing the adequate framing of a study area, which is a recurrent issue in many urban studies.

The Parcelling analysis brings a paradox. On the one hand, it is arguably the simplest category to depict, regarding the lack of diversity of its elements –just plots- at this stage of the degree. However, it is also the category hardest to understand for students, as they are usually aware of the visible and tangible buildings and streets, but are not so conscious about the frequently invisible property limits. This category introduces them to the use of the available land registries and historical maps, a tool they can use both academically and professionally and with which they can not only trace the evolution of parcels, but also stop mistaking them as urban blocks, which is one of the most common errors in this analysis. The task is to identify three different sizes of plots within the studied area and distinguish them by their front to depth ratio, which helps to learn the value of any land property and its urban utilities, as well as to ease the understanding of transitions between territorial and urban structures.

The Building analysis is probably the task most readily understood and carried out by students, as they are all familiar with the built environment. In this case, they are asked to choose how to classify the buildings according to different criteria such as their function, bulk or height. This is a tool that can be useful in the professional environment to understand diverse features and develop skills related to areas such as topology and zoning, or as an introduction to typology differentiation.

As in the structural scale, the **morphological synthesis** demands choosing which aspects of the area should be highlighted. This involves a reflexive critique very much like any professional work would require. In fact students are asked to develop this synthetic analysis as an operative diagnostic that helps to clarify criteria. In this way they are asked to come up with conclusions and devise strengths, weaknesses, opportunities and threats as in a SWOT analysis, but focusing on the impact on morphological aspects. They are also asked to think about other conditions such as views, sunlight, wind patterns, etc. concerning the relations between buildings and among buildings and open space. This is intended to help students not only with making the following steps in the proposals, but also by exposing their criteria just as any urban planner or designer would or should be required to do.

CRITICAL SESSIONS: STUDENTS' REACTIONS TO THE CONTENTS AND EVALUATION OF THE COURSE

The course is arranged so that a week before the last due date of the practical work, there is a theoretical evaluation. On the one hand, the assessment of each practice assignment consists of two sets of panels, and a public presentation in front of the class in the case of group work. On the other hand, the partial exam consists of two sets of questions, each under a quote of a text related to subjects within the course. Students are asked to answer the questions and help themselves with both drawings and references to the bibliography of the course.

One week after the last due date, there is a critical session in which the instructors and the students confront their views on the course. First, the instructors present the class with some of the best and most interesting answers from both the theory evaluations and the practical work. The chosen examples are shown, preserving their anonymity and emphasizing their clarity and depth in principles, process, and outcomes. Following this presentation, the students have the opportunity to react to the course.

Among the most recurrent comments from students are those about the excessive workload and complaints about the low results in the theoretical exams as well as in the design segment. Concerning the exams, there is usually a share of the class that answers those tests in a rather generic way, struggling with some of the concepts such as structure, form and type that may have different theoretical content in subjects from other knowledge areas. More specifically, there are some frequent problems with the concepts and content that appear for the first time in this course of the degree, such as some aspects of Urbanizing and Parcelling, the use of urban codes and regulations, etc.

With regards to the workload, the students' complaints typically start at the time of the project, once past the usually easier analysis phase. This follows a certain logic, as design is a slower task than analysis, involving a higher number of trial and error cycles, and the result of the process is less certain than that of analysis.

Given that this article covers the students' structural and morphological analysis in a deeper way than their subsequent proposals, the evaluation chart depicted (see Table 2) only covers these two aspects, which are commented on together with some other conclusions in the following section of the article.

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CONCLUSIONS

Judging from the practice results (see Table 2), the outcome from this introductory course seems quite satisfactory, given that it is new for both students and instructors.

Students generally do better in the different aspects of analysis than in their synthetic approaches. Furthermore, their morphological analysis outperforms their inquiries at the structural level. The smaller scale might be easier to perceive and to hold on to, but perhaps the biggest difference lies in that morphology studies come with the second exercise, when the groups have already had some previous experience and criticism, which they usually make good use of.

More specifically, the best evaluations come from the aspect of building analysis. This is hardly surprising for, as it has been already explained, that task is the most readily understood and carried out by the students, as they become familiar with the built environment in many other courses prior to ***Urbanística I***. However, the worst results come out of the Topography analysis, which apparently may contradict the experience argument just used, given that topography analysis is done by students in secondary school with the help of atlases and maps. It seems that contour lines, ridges and valleys are not so easily available in many study areas, and that, together with excessive confidence, may cause students to dedicate too little time to this task.

Considering the course's bigger picture, and given that the subjects covered include many themes shared with geographers, real estate executives or engineers, the authors are particularly pleased with the specific design approach of the class, both in its theoretical and practical parts. This design standpoint works on the aspects that architects specifically master, and with which they can make a more substantial contribution to the multidisciplinary team that every urban project demands.

The theoretical approach through history helps students identify relevant subjects and precedents that have an instrumental value, not as historians would do but with the specific tools and aims of architects and urban designers, through the understanding and ability to read and project the urban form. The potential implications of this standpoint in the professional practice are manifold. The related texts are selected, not only based on their theoretical relevance, but also to build a critical view towards contemporary practice, and its recent tangible examples in close cities like Madrid.

The practical part of the course works best if the proposed exercise is located in areas where old and new tissues co-exist together with empty spaces that can be the subject of the proposals. Thus, on the one hand, students learn aspects of different tissues, and on the other hand, they learn how to relate those tissues integrating them through a new design. Both tasks help to make them knowledgeable and better professionals.

Analysis at the Structural Scale

Structure aspect	Weight	Average Grade
Topography 20%	5,46/10	
Network Analysis	20%	6,54/10
Mosaic Analysis	20%	6,58/10
Synthesis	40%	5,54/10
Total	100%	5,93/10

Analysis at the Morphological Scale

Morphology aspect	Weight	Average Grade
Urbanizing	20%	6,70/10
Parcelling	20%	6,29/10
Building	20%	7,44/10
Synthesis	40%	6,54/10
Total	100%	6,70/10

Tabla 1 Sample Evaluation Chart from the Analysis Practice. Urbanística I. (Source: E. Ontiveros + J. Malo de Molina from courses' results)

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AN OPERATIVE BIBLIOGRAPHY OF REFERENCE THROUGHOUT THE COURSE

The bibliography of this course differs from those more or less generic book lists usually delivered to the student, but not so much in the actual items as in its operative character. On the one hand, every theory lesson and exam is structured in parts, each of which begins with a quote from a book, thus exposing students to the fundamental texts on the discipline. On the other hand, professors encourage students to begin their own personal libraries according to their specific preferences as a way to become expert consultants. Throughout the course, students are required to read a number of specific texts selected from the following basic bibliography:

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