The Architecture for University Residences:

Six study cases in Lisbon

Mariana Murteiro de Brito Duarte
Supervisor: Prof. Maria Alexandra de Lacerda Nave Alegre
Supervisor: Prof. João Guilherme Pontes Appleton
Instituto Superior Técnico

1. Introduction: Student Residences, typological evolution, and paradigmatic cases

The concept of living on the university campus emerges in England, with the founding of colleges in Oxford and Cambridge, in the thirteenth century. Colleges are buildings that simultaneously combine the education program with housing, having appeared as a way to solve the lack of discipline from the students of that period (Trevelyan 1948, 53-55). Colleges are organised in squared structures around an outdoor and private central patio. Access from the exterior is done through an entrance that leads to the central patio, which then allows access to the several residential areas.

In the seventeenth century, with the creation of higher education in the USA, colleges from *Oxbridge*[1] were used as inspiration for the American colleges, which combined in the same building education and housing for students and professors, promoting a learning atmosphere where the older and younger could live together and share ideas. At first, higher education was only destined to white male students from the upper class but, over time and with the approval of access to females and native American groups (black people) to higher education, the buildings suffered some typological changes (Yanni, 2019).

As said before, the buildings were designed only for men and had between three and four floors and the most common typologies were divided between residences with multiple independent entrances, like in the Stoughton dormitory (1804), and residences with a central hallway, like in the Nassau dormitory, in Princeton (1754-56). There should also be noted another typology with a lateral hallway, like in the building "Old West" from the Dickinson College, where the architect Benjamin Henry Latrobe proposes a "U" shaped building.

With the introduction of female dormitories, multiple independent entrances and central hallway typologies become now coexistent, such as in Breecher, Kelly and Green Halls from the University of Chicago (1892-93), in which the building is divided in three blocks, each one with a central access to a central hallway along which the bedrooms are located.

In the 20th century, after the Second World War, the insufficient number of beds and increase in demand due to the growing number of university students in America were the reasons for the rise in the number of beds in the existent dormitories, resulting in a problem of overcrowding

[1] Term used to simultaneously mention the English Universities of Oxford and Cambridge.

and lack of privacy. The solution found for this problem was the development of a new typology of university residence – the skyscrapers. In regards to this new typology are to be noted the dormitories from the University of Rutgers (1995), in which the housing was organised in three buildings with nine floors, with each floor having the bedrooms distributed along a central hallway, shared areas (shower room, kitchen and living room) and vertical access located in the centre of the building; the Silver Residence Center for the New York University Uptown, by Marcel Breuer (1956-61), in which the design was supposed to separate the male and female dormitories in different buildings, but instead two different buildings were built, a social wing where the common areas were located and a bedroom wing, where men and woman were then separated into different bedrooms; and also, the Morril and Lincoln residence towers from the University of Ohio, by Cornelius and Schooley (1963), which stand out from the previous ones by making use of a "hive" like centralised organization.

Later on, students living in these skyscrapers' dormitories identified in those spaces security problems (for instance, against fires), and also social problems, claiming that their individuality wasn't preserved with every bedroom being shared and exactly like each other, contributing to the appearance of the hill town and cluster colleges typology, which consists in a design where the several buildings have an organic and horizontal disposition along the land. Collegio del Colle from the University of Italy, by Giancarlo de Carlo (1962-66), appears then as inspiration for the adoption of this typology in America, like in Kresge College (1968), for instance.

Research on the current situation of the university residences in the cities of Barcelona, Espoo, Lausanne, Mendrisio, Stockholm and Copenhagen, in Europe, reveals that although the typology of the building is usually based on central or lateral hallway, there is a new typology of apartments with single bedrooms and common areas (kitchen, living room and toilet facilities) shared between 2 to 5 people, like in the residence Casa dell'Academia, in Mendrisio.

2. Student Residences in Portugal: study cases

In Portugal, the birth of higher education was in the city of Coimbra. Initially, in the 16th century, this type of education was associated with the Church, being only taught in religious schools. In 1834, with the abolition of religious orders, students started living in rented bedrooms and houses, by splitting the rent between each other, which allowed to accommodate a higher number of students at a lower cost, and spreading around the city resulted in the traditional ''República de Coimbra''. This type of housing promotes common spaces to the detriment of individual ones, in a collective atmosphere of sharing ideas, political views and daily life. Afterwards, with Salazar's plan that aimed to promote, reorganize and grow the university, the city was subjected to major restructuring that led to the demolition of many buildings, with the biggest part being the ''República'' students housing. More recently, and as a result of the new crisis on students housing, residences for higher education students from the very universities have emerged, in which are to be noted the residences from Pólo II and Pólo III from the

University of Coimbra, by the architects Aires Mateus (1999) and Paula Santos (2003) (Queirós, 2017).

2.1. Six case-studies in Lisbon

In this study, six university residences (RU) in Lisbon are analyzed. Four from the public sector that belong to the "Serviços de Ação Social" (social services) from the University of Lisbon (ULisboa): RU from Faculdade de Motricidade Humana (FMH) which was refurbished in 2017; the upcoming RU located in the former Canteen 2 from ULisboa, by making use of the vacant building; RU from the Ajuda Campus, a new construction with the design selected by public tender, in which one of the wings is already operational since the academic year of 2020/2021, while the other is still under construction; and the winning design in the tender for the RU from the Cidade Universitária of Lisbon. The two private sector residences are the RU from Álamos, located in Alameda from the Cidade Universitária, that has the peculiarity of being a religious and female only residence and the RU Collegiate do Marquês de Pombal, a three building refurbishment.

With a privileged location in relation to the higher education institutions that surround it, the first **Residence of the University City** was created, with a project by the architects Alexandre Marques Pereira and Miguel Saraiva. The three buildings that make up the set, delimit and form a square 80 meters long and 60 meters wide, deploying in order to enhance the relationship with the surroundings and the dynamics of the residence itself, with visually permeable ground floors, which allow a covered path and crossings to the streets and adjacent buildings. It will have a total of 816 beds, spread over the 3 buildings (300 beds in building 1, 177 in building 2 and 339 in building 3). Commercial spaces on the ground floor of the complex are also contemplated, as well as three underground floors for car parking under the square area.

The standard floor of building 1 is organized according to a double central corridor with access to the rooms, separated by server spaces. The rooms are distributed along the south and north facades, the common spaces and the vertical circulations (stairs and elevators) occupy the entire central area, interspersed by voids that cross the building vertically. In this way, natural lighting and natural ventilation are guaranteed in all the interior spaces of the building.

The standard floor of building 2 is organized according to a type of side corridor that gives access to the rooms. It distributes the rooms along its length, concentrates the common spaces centrally and divides the vertical circulations into four equidistant cores. The horizontal distribution circulations for the rooms are located along the east and west facades, connecting to a central crossing, next to the common spaces.

The standard floor of building 3 is organized according to a typology of central distribution corridor for the rooms. The common spaces (kitchenettes, dining rooms, living rooms and study rooms) are located next to the core of vertical circulations, distributed over 4 moments: at the ends, in the corner of the building and also in the middle of the larger body.
The room (single or double) is organized, from the entrance, as follows: toilet, private in the case of the single room and shared in the double room, followed by a storage area for clothing, a rest area and a work area next to the window. All rooms have an outdoor area (balcony).

Inserted in an urban area made up of the scattered buildings of the University Center and uncharacterized public spaces, the residence on **the Ajuda Campus** appears as the only housing facility for students in this Center, designed by the CVDB atelier – Cristina Veríssimo and Diogo Burnay, in collaboration with the architect Rodolfo Reis and architect Joana Barrelas. The project's premises include the definition of a 'quadrilateral' building, with a compact volume, which delimits a central square 15 meters wide and 26 meters long. The creation of visual strings breaks the compact condition of the building.

Similar to the ground floor, the standard floor is organized according to a central corridor to the east, west and south and a lateral corridor to the north. The rooms are distributed along these corridors and the common spaces are located on the outer corners. The vertical circulations are located in the interior corners of the building. Along the corridors there are spans that establish visual relationships with the square and with the exterior of the residence.

The rooms have an antechamber at the entrance of each two single rooms or each double room, where the sanitary installation is located, divided into two spaces (shower on one side and washbasin and toilet on the other), optimizing its use in times of greatest demand by the students who share it. From the antechamber, the bedroom is organized as follows: storage area for clothing, rest area and work area by the window.

The university residence building of the **Faculdade de Motricidade Humana (FMH)**, is located in Cruz Quebrada, an area farther from the center of Lisbon and other faculties, however, it is located two minutes' walk from the FMH. The building was granted to the SAS of the Universidade Técnica de Lisboa in 1977, having been occupied by a student residence and in 2017 it was remodeled with a project designed by João Sousa, architect of the rectory of the University of Lisbon.

At the ground floor level, its organization follows a typology of longitudinal central corridor dividing transversally by the entrance hall and stairs. On this floor, the bedrooms and respective changing rooms are located to the north, while the kitchen, living room and laundry room are located to the south. The standard floor is organized according to a typology of central

distribution corridor for the bedrooms and changing rooms. Centrally located the vertical circulation, to the west, and a study room to the east.
Rooms in F.M.H. are double, and are symmetrically organized from the entrance with a clothing storage area, a rest area and a work area, next to the window.

The building complex of the **Antiga Cantina 2 of Cidade Universitária** presents an irregular layout and volumetry. In addition to the main building built in the 1960s, during the Estado Novo period, annex buildings to the north were added over the years. The project's options include demolishing these additions to make room for the construction of a rectangular implantation volume from scratch, destined for the bedroom program (North Block), and recovering the building from the Estado Novo period to house the common spaces of the residence (Southern Block).

The south block, intended for common spaces, has an above-ground floor and a under-ground floor. The north block, destined for the rooms, is 58 meters long and 20 meters wide, three floors above ground and one underground floor. On the top floor, part of the coverage is accessible. The connection between the two blocks is made through a corridor transversal to both, which divides the north block into two wings. Thus, all floors of the north block are organized according to a typology of central distribution corridor for the rooms with vertical accesses located at the extremes and centrally, along the transversal corridor.

In this residence all rooms are double, except for rooms for people with reduced mobility, which are single. The double room is organized, from the entrance, as follows: shared toilet, followed by a clothing storage area, a rest area, and a work area by the window.

The **Collegiate Marquês de Pombal** Student Residence is located in the center of Lisbon, occupying the entire block front of Rua do Conde Redondo, designed by the architect José Manuel Quintela, with Bernardo Durão as the responsible architect. This is a project for the rehabilitation of a set of three office buildings built in the 60's and 70's, with a U-shaped layout, which housed the services of the CTT, being vacant and in an advanced state of disrepair at the time of the intervention. The underground floor contains the common areas and the technical areas of the residence. The common areas located here, space formerly without natural light, gained light through the demolition of the slabs of the body that occupied the old street, which allowed the existence of a skylight. The space program includes two dining rooms, with a fully equipped kitchen, a games room, a cinema room, laundry, gym, indoor swimming pool and bicycle parking. These spaces are distributed around the central living space, naturally lit by the double-height skylight.

The standard floor is organized according to a typology of central distribution corridor for the rooms. The vertical accesses (stairs and elevator) are located in the inflection areas of the corridor, with a waiting space in front to elevators.
The rooms are divided into 10 different types, double or single. It is organized from the entrance as follows: dressing area (closet) and private toilet on one side, pantry with kitchen on the opposite side, rest and work space at the back, next to the window.

The **Álamos** University Residence is located in Alameda da Cidade Universitária. It is a women's residence designed by the architect João Serrano, inaugurated in 2017.
The north wing is organized according to a typology of central distribution corridor for the remaining common spaces: on one side, the dining room, pantry, kitchens and refrigeration and freezing areas, with a visual connection to the playground; and on the other side of the corridor is the multipurpose room, laundry and laundry, a living room and an office. At the end of this corridor are the vertical circulations.
The standard floor is organized in such a way as to separate the rooms from the other common spaces of the residence. Thus, in the south wing, distributed peripherally in relation to the central staircase and mezzanine, there are rooms for individual study, a group study room, a toilet, a living space that establishes a visual relationship with the university boulevard and the side entrance to the chapel. To the north of the chapel is an access corridor to the chapel's main entrance and antechamber, and to the vertical circulations. From this point, the north wing develops with a typology of central distribution corridor for the rooms. At the end of this corridor are the vertical circulations.
The bedroom is organized, from the entrance, as follows: on one side, the clothing storage area, the rest area and the work area by the window; on the other side the private sanitary installation and another storage area. All rooms in the residence are individual and are approximately 17 square meters.

2.2 Comparative readings

The comparison between the six student residences allows the understanding of intervention strategies and project options related to the following items of analysis: location/implantation, typology, material options and room.

Location/implantation

The residences in study are located, for the most part, in University Centers: three in Cidade Universitária, one in Pólo da Ajuda and one in Faculdade de Motricidade Humana. The exception is the privately owned RU which is centrally located in the city of Lisbon (Marquês de Pombal).

The implantation strategy is unique for each residence where the blocks are implanted, adapting to the urban conditions of the lots they occupy (configuration, dimension, access and orientation). Depending on the different locations, there is the arrangement of blocks that create urban squares or courtyards (residences of Cidade Universitária, Ajuda and Álamos, which are new buildings), or blocks that articulate with each other in 'H' (Antiga Cantina 2 da Cidade Universitária, for the expansion of an existing building), in 'U' shape (Colegiate Marquês de Pombal residence, construction of the end of a block), and linear block (FMH residence, an existing building).

Program

The program is divided into two large groups: common spaces (public access spaces) and bedrooms (private access spaces). The analysis of the case studies allows us to identify two distribution strategies for these two groups by the blocks that build the university residences: 1) separation of the two groups into distinct blocks (University Cantina Residence and Álamos Residence) or by floors (Collegiate Marquês de Residence Pombal); 2) joining of the two groups (rooms and common spaces) on the same floors (Residences of Cidade Universitária, Ajuda and FMH).

In cases where the distribution strategy is the separation into distinct blocks, in the Antiga Cantina 2 residence it is in the south block that all the common spaces are located and in the north block all the rooms. The same happens at Álamos, where the common spaces for the residents and community to use are located in the south wing (chapel and study rooms) and the rooms on the two upper floors in the north wing.

In the case where the strategy involves the junction of two large groups of spaces, is observed the location of common spaces, on the rooms floors, next to the vertical circulations (Residence of Cidade Universitária and Ajuda) and the separation of these spaces located in the same floor, through the central corridor (FMH Residence).

In residences that have common spaces distributed over the floors, these include pantries, study rooms and changing rooms, being the spaces considered to have a closer and necessary relationship with the bedrooms. In the case of Pólo da Ajuda and Cidade Universitária, in addition to pantries and study rooms, there are laundries on each floor for residents to use.

The program of the common spaces of the observed university residences is divided into four groups of spaces: leisure (living, multipurpose, games, TV/cinema, study); meals (meals, kitchen, pantry, refrigeration/freezing); services (laundry, laundry, drying, terrace); and complementary spaces (gym, swimming pool, spa, chapel).

Areas

It is considered that, in comparison with the area of common spaces available, the Álamos residence is the best served by common spaces in relation to its occupancy capacity. The remaining residences have a value of approximately 50% of beds compared to the other spaces, with the Collegiate Marquês de Pombal Residence being the one with the highest percentage of living spaces. It is thus concluded that public residences are those with values closer to those recommended by the DGES, revealing greater pressure to optimize the number of beds, not reaching, however, the % of recommended occupancy (63%).

Typology

The typological analysis of the distribution and articulation of the spaces served (rooms) and servers (circulations) of the analyzed residences allows us to identify the typology of the central corridor as dominant (residences of Cidade Universitária, Ajuda, Antiga Cantina 2, FMH, Collegiate Marquês de Pombal and Álamos). The typology of a side corridor is also identified in one of the blocks of the residence of the university city and the residence of Ajuda.
The vertical circulations, as a rule, occupy the tops or corners of each block. When necessary, and to comply with regulatory standards, vertical circulations are added in a more central position. As an exception, reference is made to the FMH residence whose vertical circulations occupy a central position (probably as a design option to maintain the building's original circulations).
Finally, it is highlighted the proposal for building 1 of the university city residence, which presents a typology of double central corridor with access to the rooms, separated by common spaces (pans with spaces for meals and study) separated by spaces that allow the lighting of these spaces.

Material options

With regard to material options, it is possible to verify that in public residences there is a greater concern with rationalization in terms of costs, seeking economic options that offer guarantees of quality/durability. This option is more accentuated in residences that were not subject to public tender (Antiga Cantina 2 and FMH). Generally speaking, the floors are covered with vinyl roll and the walls are painted.
These economic restrictions on the selection of materials are not so severe in private homes, where materials such as marble are found. In the case of the Collegiate Marquês residence, the selection of materials and colors to be used follows the guidelines used for the design of the international residences of the same promoter.

Bedroom

The rooms, single and double, follow a systematic organization, defined by the following areas: sanitary installation, clothing storage area, rest area and work area.

In public residences it is possible to identify variants such as: the existence of balconies in all rooms of the University City Residence, being the only residence under study to provide this relationship with the outside; the sanitary installation in the rooms of the Pólo da Ajuda residence is separate from the bedroom itself, located in an entrance hall, seeking to optimize its use time; and the existence of a partition between the work area and the rest area in the residence of the Antiga Cantina 2 of Cidade Universitária, solving the problem of sharing and living with students who live in shared rooms.

It is possible to affirm that the design of the furniture integrated in the construction is fundamental for the definition of the different areas and the search for solutions that rationalize the available space. This does not happen in the residence of the Faculty of Human Motricity, where the rooms do not have any organizational rules, and the furniture is mobile.

In private residences, the standard room at Álamos follows a similar organization to the public residences, however, only the lockers are integrated. In the Collegiate Residence of Marquês de Pombal, the structure of the building not only conditions the organization but also the useful areas of rooms of the same category. All these rooms have kitchens, turning them into studios, in which all basic needs can be carried out.

3. Conclusions

Colleges are a type of housing for students that appeared in England in the 13th century and has been subjected to a lot of research and changes regarding its typology organization over time. Cambridge and Oxford typologies are to be noted for influencing American dormitories, in which the multiple entrance, central and lateral hallway typologies started as being the most common and allowed to work out the social and racial problems of that period. Later, Baker House by Alvar Aalto and the several 1960s approaches, that were more oriented towards the students' needs, appear as more modern examples. Currently, a new typology is emerging in which shared apartments with private bedrooms are now distributed along a (central or lateral) hallway instead of shared bedrooms, where the students are responsible for its maintenance and hygiene, in what resembles a more traditional household, with the only difference being that it's shared among students.

In the case studies analyzed in chapter 2, the most dominant typology of RU (university residences) lays in the distribution of the bedrooms along a central or lateral hallway, in opposition to the present European situation mentioned above. The connection between bedrooms and common spaces is presented in different ways: by partition in different wings or distinct floors, or by distribution along the bedroom floors. The common spaces that have greater use are the ones related to everyday use: kitchens, dining areas and study rooms. Single and double rooms have a strict connection to the sanitary facilities and are included in the bedroom of every RU, with the exception of the RU from FMH. Designed furniture and integration into the construction not only allow for a better use and space optimization of the bedroom, but also to a better organization in terms of clothing, rest and studying areas, which is common to every bedroom analyzed.

The conception and combination of the spaces and the choice of materials have revealed to be essential in creating the desired environment for each residence, in a way that there is a more luxurious atmosphere in the Collegiate residence, due to their choice of furniture and presence of more premium materials, and in the Álamos residence, due to the sobriety transmitted by the marble stone, as opposed to Pólo of Ajuda, due to their use of very diverse colours.

Therefore, it would be important to dig further and develop the research done in this MsC dissertation through the application of a **post-ocupation evaluation** methodology, in order to collect opinions and daily routines of the residence users (students, administrators, staff members…), to better understand the different typologies performance and choices taken.

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