FREEHAND DRAWING AS A DIDACTIC INSTRUMENT

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INTRODUCTION

This paper was guided by the following research question: how freehand drawing teaching influences design teaching? The bibliography regarding freehand drawing as a design instrument is extensive and diverse, underlining its different associated procedures, such as perception, conception and communication.[1] Less relevance has been given to freehand drawing as a didactic instrument, that is, as a means used by instructors and students for the transmission and acquisition of knowledge.[2] It is intended to consider the didactic role of freehand drawing and its importance in the architectural design teaching, based on the analysis of the intersections between the courses of drawing and architectural design at the Faculty of Architecture of the University of Porto (FAUP). Considering the progressive loss of relevance of drawing in architectural curriculum plans in recent decades,[3] the aim of this paper is to understand why to continue to teach freehand drawing and how this interferes or determines the way of teaching architectural design.

METHODOLOGY

The research was conducted as a qualitative embedded single-case. All courses of Architectural Design and Drawing from the five years of the FAUP master's program in architecture were considered, according to three units of analysis: educational purposes, principles and practices. In order to guide the procedures of data collecting, recording, analyzing and interpreting, a Characterization Matrix (CM) was formulated. The CM allows to relate the three embedded unities of analysis – i.e., the educational purposes, principles and practices – with the three main sources of evidence in which the object of study manifests itself: instructors, expressing how the model is assumed; architectural design classes, expressing how the model is achieved; and students, expressing how the model is acquired. The main research methods that have been used are naturalistic observation, participatory observation, in-person-interview and conversation, complemented with artifact analysis, and documentary and bibliographic review. Field data were collected through direct observation and recorded in raw field notes. Considering the exploratory nature of the research, an open data collection model was followed during the recording sessions. Later, the field notes were revised and transcribed to digital form and submitted to thematic analysis.

RESULTS

Curricular context and organization

The analyzed courses are part of the integrated master's degree in architecture at FAUP, which in total lasts for five years. The design studios are mandatory and on an annual regime, so there are five studios, one in each academic year, called Architectural Design 1, 2, 3, 4 and 5. The workload of the five studios is the same, 12 hours per week. Among the five Architectural Design studios there is a curricular alignment, both in terms of topics covered, pedagogical objectives and teaching approach. Thus, the general organization of design studios is not decided year by year by the responsible instructor, but is defined collectively.

The two drawing courses are also required to be attended annually and are taught in the first two years of the master's degree, called Drawing 1 and 2. In terms of workload, and consequently, in terms of curricular weight, Drawing 1 is quite considerable, when comparing to Architectural Design, with 8 hours per week, while Drawing 2 is 3 hours. Also in the case of the two drawing courses there is a previously established curricular alignment, with a program that must be completed by all classes.

Horizontal and vertical intersections

It is possible to verify by the context and curricular organization, that the most direct intersections between the design studios and the drawing courses – which here are called horizontal intersections – happen in the first two years of the master's program, where they are simultaneously taught. In addition to the coordination that exists between courses, it is also during this period that students need to follow a singular rule of this school, which is the prohibition of computer use in design studios. According to this rule, students must produce all design representations with analogue means, where freehand drawing plays a major role. While in the drawing courses students are learning the fundamentals of freehand drawing – through the systematization of the instrumental and expressive component, the different ways of drawing and the various representation systems[4] – in the design studios they are making the practical application of this learning.

In the first year, the intersection between design studios and the drawing course takes place mainly at an instrumental and procedural level. In Architectural Design 1, for example, students are required to use visual drawing to approach the intervention site, as they do in Drawing 1. The entire design process is also supported by freehand drawing – and complemented by physical models – where in addition to the technical representations, studies of shape and volume are carried out.

In the second year, however, there is a direct link between the exercises of the two courses. In Drawing 2, students produce drawings of the intervention site used in Architectural Design 2, such as perspectives with one or two vanishing points, impressive surveys of the plans and elevations of the site and the surroundings, axonometries and aerial perspectives. This material is then used in both courses and serves as a basis for experimenting with design solutions.

In these first two years, design studios have then explicit intersections with drawing courses. However, there are also intersections throughout the different academic years, more discreet and subtle,[5] which here are called vertical intersections. These intersections have to do with a particular use of freehand drawing in the design process, but also with the teaching approach itself, as will be explained below.

Freehand drawing and design teaching

As already mentioned, during the first two years, students are required to use only analogue means of representation, which are essentially freehand or technical drawing and physical models. In addition to the project design drawings, where freehand drawing is used as a thinking resource, students are led to resort to freehand drawing for the recognition of the intervention site, producing perspectives with one or two vanishing points, aerial perspectives, axonometric perspectives and impressive surveys [Figure

1]. It is assumed that during these first two years, the propaedeutic character[6] of the design studios is not only related to the acquisition of instrumental capacities, the dexterity and mastery of the different representation systems, but also the indication of a method of designing.[7]

After these first two years, the use of freehand drawing as a design instrument is significantly reduced. Having the freedom to choose the forms of representation they prefer, many students start using Autocad, Revit or Archicad. The freehand drawing used as a way of thinking, in the exploration of design solutions, however, continues to be used. No longer for the entire class, but for a significant part of it. It is common for students to associate freehand drawing with other forms of representation in the design process, especially digital ones, using one or the other according to specific needs [Figure 2]. There is a cycle in the elaboration of the design project – a process –, which consists of the production of digital representations, which are then printed, and manipulated through freehand drawing, using tracing paper or drawing directly on the prints [Figure 3].

Freehand drawing is also used as a means of interaction between instructors and students, during the so-called design critiques.[8] Not just for the first two years, when students are required to just use freehand drawing, but for the entire five years of the masters. Even when students are working almost exclusively with digital media, freehand drawing is always used in design critiques. It is very common for instructors to ask students to print out the design elements so they can draw on it [Figure 4]. Several instructors mention that this is a kind of necessity, since without direct demonstration through freehand drawing, critiques would be much less effective for students.[9]

One manifestation of the importance of freehand during design critiques was during the pandemics.[10] Despite the discussions taking place through the screen, instructors and students quickly began to resort to drawing tools, using the mouse to interact and manipulate the students' productions [Figure 5].

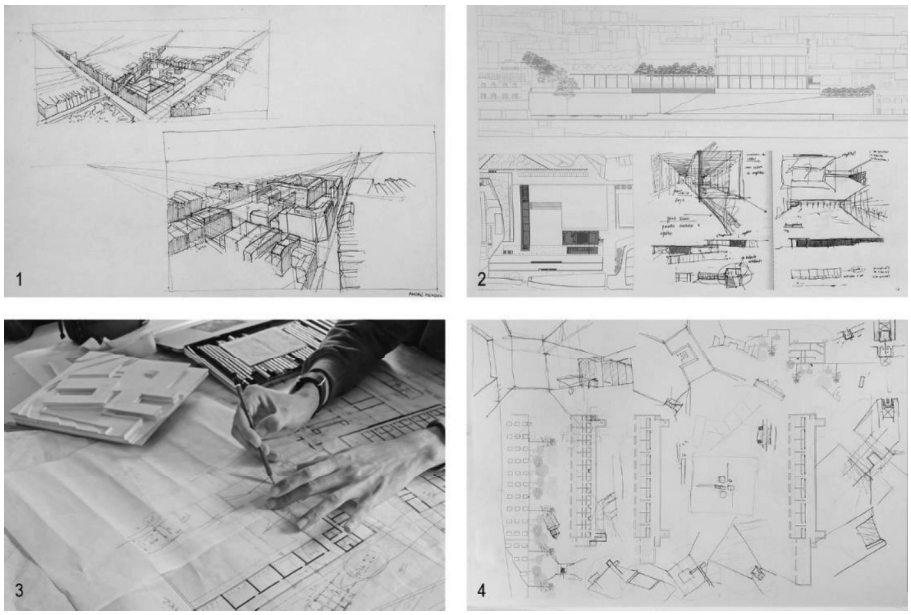

Figure 1. Aerial perspectives of the intervention site – Drawing 2, 2020.
Figure 2. Student's poster with analogue and digital representations – Architectural Design 4, 2022.
Figure 3. Student using tracing paper to draw on a printed CAD drawing – Architectural Design 4, 2022
Figure 4. CAD drawing with drawn annotations – Architectural Design 4, 2022.

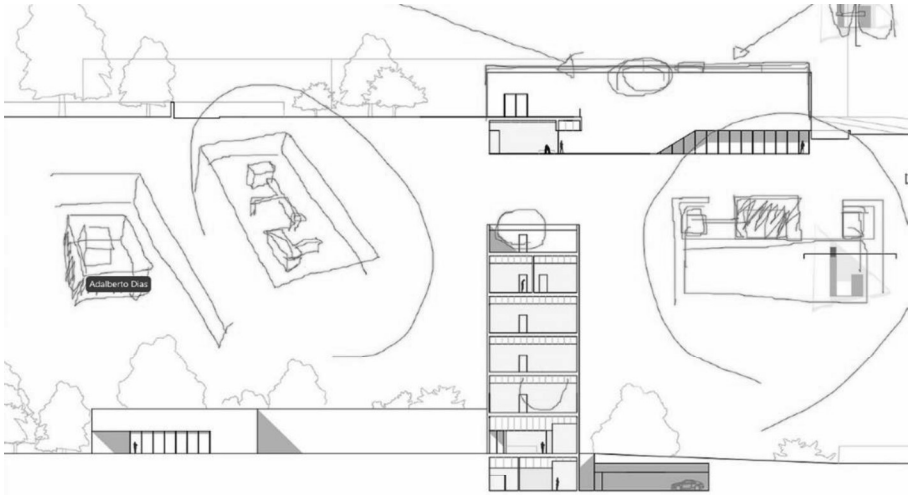

Figure 5. Shared screen during design critiques – Architectural Design 4, 2021.

DISCUSSION

Freehand drawing as a design instrument

Considering the horizontal and vertical intersections analyzed, as well as the didactic approach in design studios, it is possible to recognize two roles of freehand drawing in design teaching at FAUP. The first is the role of freehand drawing as a design instrument. In this school, the training of the student in freehand drawing is considered fundamental, and therefore there is a large investment in the first two years of the integrated masters. Not only because students must attend two annual and mandatory drawing courses, but also because they are subject to the rule of not using digital media in the design studios. It can thus be seen that there is a direct coordination between courses for a common objective, in this case, the teaching of a design process or methodology based on freehand drawing.[11]

While in the drawing courses the technical and expressive dimension of drawing is focused, in the design studios students learn how to apply this knowledge. Students then use freehand drawing: as a perceptive tool to approach the intervention site [Figure 6]; in the process of form finding, definition of design ideas, volumetric and spatial studies [Figure 7]; to make technical representations of the design project, such as plans, sections and elevations [Figure 8]. Freehand drawing is also used in the more advanced stages of the design process, to solve a particular detail or a constructive issue [Figure 9] – which is rarely mentioned in the literature, as freehand drawing is usually associated with the initial conceptual phases.[12]

Despite drastically decreasing its use after the first two years, freehand drawing continues to be present in the design process of many students, especially in the so-called study drawings.[13] These study drawings are often crude and dirty, produced quickly, as an extension of thought.[14] Freehand drawing can then be seen as the starting point of students' training, a kind of prerequisite, which gives them instrumental and technical skills of spatial perception, representation, conception and communication, which constitutes a method of designing.

Freehand drawing as a didactic instrument

There is a second role of freehand drawing that can be recognized in design teaching, and that is its use as a means of interaction between instructors and students in the teaching and learning process, that is, as a didactic instrument. As mentioned, students start the master's program with a propaedeutic period, where they have an intensive training in freehand drawing. On the one hand, because there is a

conviction in this school of the importance of freehand drawing as a design instrument, due to its several qualities as a form of representation.[15] On the other hand, because freehand drawing plays a fundamental role in the learning process itself.[16]

At a more immediate level, the teaching of freehand drawing corresponds to a didactic strategy, whose objective is to circumvent the enormous heterogeneity of students when they arrive at university. Considering that they all have very different backgrounds, from arts, humanities, sciences and technical courses, this is a way to put them all on the same starting point, with the same knowledge and resources.[17] Moreover, students receive training similar to that of design studio instructors. This aspect is very important, because the fact that they share a representative and procedural literacy – in other words, metaphorically, they share the same language – makes it possible to create a unique "trading platform" between them.[18]

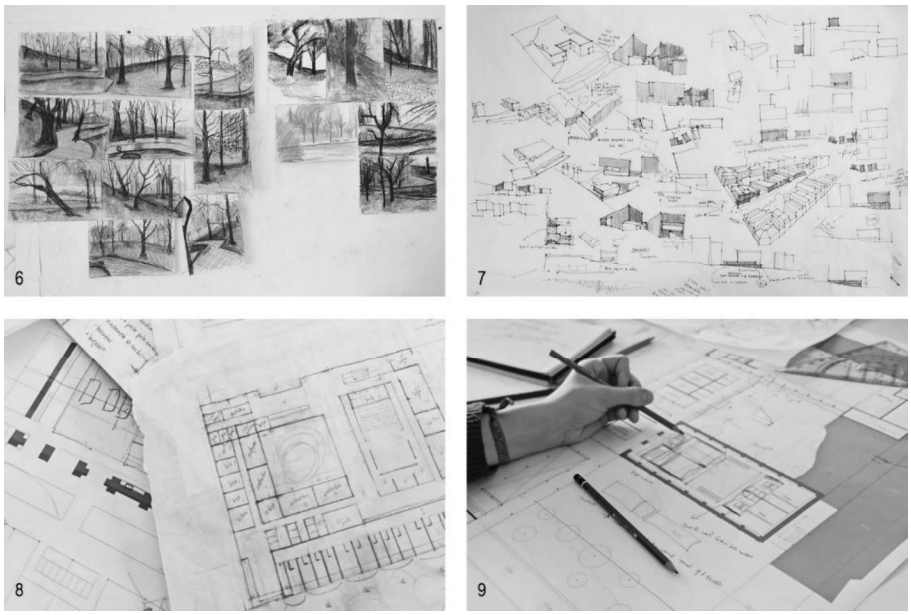

Figure 6. Recognition of the intervention site – Architectural Design 1, 2022.
Figure 7. Student's design process – Architectural Design 2, 2020.
Figure 8. Handmade technical representations – Architectural Design 4, 2022.
Figure 9. Student drawing on a printed CAD drawing – Architectural Design 4, 2022.

This form of interaction is significant in the early years, when students still have little autonomy, but also throughout the master's program. If, as it was mentioned, the use of freehand drawing in the most advanced years reduces substantially, its use in design critiques is never reduced. During the five years of the masters, passing through all the design studios, it is visible how instructors and students actively resort to freehand drawing to support design critiques. Even when students are working essentially with digital representation forms, instructors ask them to print the design elements before the design critiques, so that the criticism is not merely verbal or gestural [Figure 10].

The fact that instructors draw during design critiques is not a particularity of FAUP, since in other schools, even where freehand drawing is not part of the curriculum, instructors often draw. As referred by Gero and Milovanovic,[19] about 60% of instructors' verbalizations during design critiques are followed up with an action in external representations. However, what happens at FAUP is that students also draw. Most of them resort actively and systematically to freehand drawing, which makes it form

of dialogue with instructors [Figure 11]. They can use freehand drawing to quickly ask questions, to clarify a design ambiguity, in short, to discuss [Figure 12]

Students' drawn productions also play an important role in, as an expression of their knowledge and pedagogical situation.[20] Whether the drawings made during design critiques, in real time, or the drawings made during the design process, are crucial for instructors to track their progress [Figure 13]. This is done for an extended period, for one entire year, with different points of intermediate evaluation, where both instructors and students consider the progress made so far. It is also an opportunity to recognize the relationship between didactics and the results achieved, which is an important aspect of the learning process. Because, as mentioned by Quadros,[21] one of the difficulties of this type of didactics is the mismatch between awareness of learning and its experience.

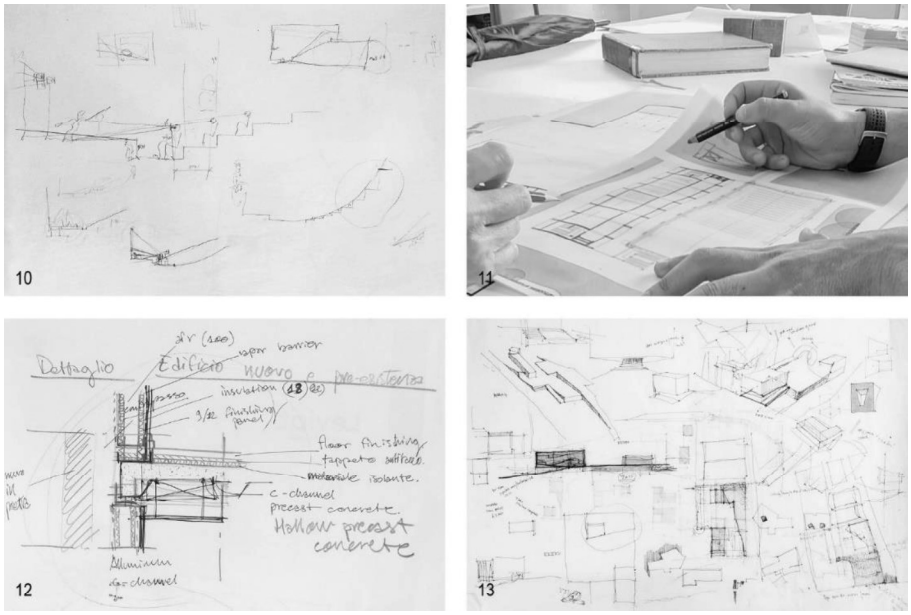

Figure 10. Professor's drawing explaining a design issue – Architectural Design 4, 2022.
Figure 11. Instructor and student drawing during design critiques– Architectural Design 4, 2022.
Figure 12. Student's drawing to clarify a constructive doubt – Architectural Design 4, 2022.
Figure 13. Student's design process – Architectural Design 2, 2020.

Teaching and learning vulnerabilities

Finally, after characterizing this way of teaching and learning, it is important to point out some of its vulnerabilities. They can be organized into two groups. The first group has to do with a difficulty for students to understand the school's didactic strategy, as already mentioned, about the importance given to freehand drawing in the first two years, associated with the prohibition of digital media. Not all students are able to understand the purpose of this option or agree with it, which can be problematic, as this can condition their readiness to learn.[22] There are cases where students even subvert the rules set by instructors, using Autocad, for example, then printing and reproducing the drawings by hand. Among the students, there are those who consider this way of learning old-fashioned, and that the importance given to freehand drawing in this school does not make sense. They usually argue with the professional issue, that is, that the university should prepare them more directly for professional life.

Another aspect has to do with the importance given to the representation as the center of didactics, and that can lead to an overvaluation and autonomy of the freehand drawing to the design itself. In some cases, students tend to confuse the design with its representation, and design qualities with graphic

qualities. As Mendes states,[23] the formal exploration or production of images without critical awareness, not understanding design in its relationship with reality, removes all the pedagogical value of design studios, making these simple graphic exercises or demonstrations of virtuosity.

Regarding the second group of vulnerabilities, it is related to an imbalance in the relationship between instructors and students, which is one of the pillars of this form of teaching. One of the aspects to consider is the subjective component of the criticism made by instructors. Besides objective questions, in which instructors may argue about typologies, constructive procedures, regulations and legislation, there is an aside from criticism that is entirely subjective, referring to their personal experience and sensibility.[24] For this reason, it sometimes happens that students do not accept criticism as valid, considering it just the instructor's opinion.

Moreover, it may also happen that students see the instructor as the last criterion to validate a design decision. This leads students to loss of autonomy, annulling their critical capacity, and making them unable to move forward without the instructor's approval. Another issue has to do with the personalization of this way of teaching, overlapping students' performance and work with themselves. At FAUP, where teaching is mainly about individuals – and where the idea of the author architect is still very present – students may personalize a failure, affecting their self-esteem, leading them to avoid risks. This is problematic because, as referred by Lawson,[25] mistakes and failures are a crucial part of the design learning process.

CONCLUSION

With this paper it was aimed to understand the role of freehand drawing in architectural design teaching and how it influences or determines the teaching approach at FAUP. Either by the curricular intersections of the design studios with the drawing courses or by its presence in the design critiques, it seems possible to refer that freehand drawing has a central importance in the way architectural design is learned and taught in this school. As it is learned, because as it was referred, all students in the first two years learn freehand drawing at the same time they learn to apply it in the design process, functioning as a general base training. Thus, freehand drawing becomes for all students the first and most important design instrument, which will later be complemented with other forms of representation. As it is taught, because freehand drawing in this school is also a didactic instrument, used as a means of interaction between instructors and students in monitoring the design process. The option of teaching freehand drawing does not seem to contradict or compromise the new possibilities brought by digital media, but rather the opposite. As mentioned, students often use freehand drawing in addition to CAD drawing or digital and physical models, acting as a structuring and articulating element between the various forms of representation. An important future work to do would be to analyze design teaching in a school where freehand drawing is not part of the curriculum. Considering that even in these cases, as referred by Gero and Milovanovic, [26] instructors often resort to drawing, it would be relevant to understand what changes in the interaction with students, and consequently in its pedagogical effectiveness.

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NOTES

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