

Article

## Sketching as a key instrument for design in architectural education

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### Abstract

With this article it was intended to approach sketching as a form of representation and its relation to design in architectural education. For this purpose, recent publications focused on sketching and its role in design processes were reviewed, using the theoretical and drawn work of Álvaro Siza Vieira as a guiding thread. Firstly, it was sought to determine the nature of sketching, its purposes and its particularities in educational context. Secondly, the role of sketching in design was explored considering the procedures of recognition, transformation and presentation.

### Keywords

architectural design teaching; architectural education; forms of representation; sketching and design.

### Introduction

In the last decades, the relevance of sketching or hand drawing has decreased in the scope of architectural education, confronted with the exponential and unprecedented development of the the new forms of representation (Have & Toorn, 2012). However, it seems that the multiplication of possibilities has also multiplied uncertainties about the very principles of architectural training and education.

With this article it was intended to approach sketching as a key instrument for design in architectural education. Thus, recent publications focused on sketching as a form of representation and its role in design processes were reviewed. It was decided to use the theoretical and drawn productions of Álvaro Siza Vieira as a guiding thread, considering his paradigmatic example both in architectural practice and teaching.

Firstly, it was sought to determine the nature of sketching and its relationship with design processes in archi-

tectural education, its purposes and its particularities as a form of representation. Secondly, the role of sketching as an instrument for design in the educational scope was considered, distinguishing the procedures of recognition, transformation and presentation.

### 1. The nature of sketching

In 2003, *Casabella* (n.770) opens with a short article by Álvaro Siza Vieira entitled *Sulla Pedagogia*. Facing the amount of knowledge that the practice of design requires in our contemporaneity and its provional nature, Siza Viera argues that it is important for architecture students to acquire a particular ability: to learn how to learn – they must be able to formulate questions, to keep an open mind and to develop a critical sense (2003). This ability, as the author argues, is strictly linked to drawing – as “learning to see, to understand, to express” (2003: 4). It seems important to clarify two aspects of Siza Vieira’s proposal: first, when the author uses the term “drawing”, he is referring to a particular type of drawing, known as free hand drawing or sketching (Lyn & Dulaney, 2009);

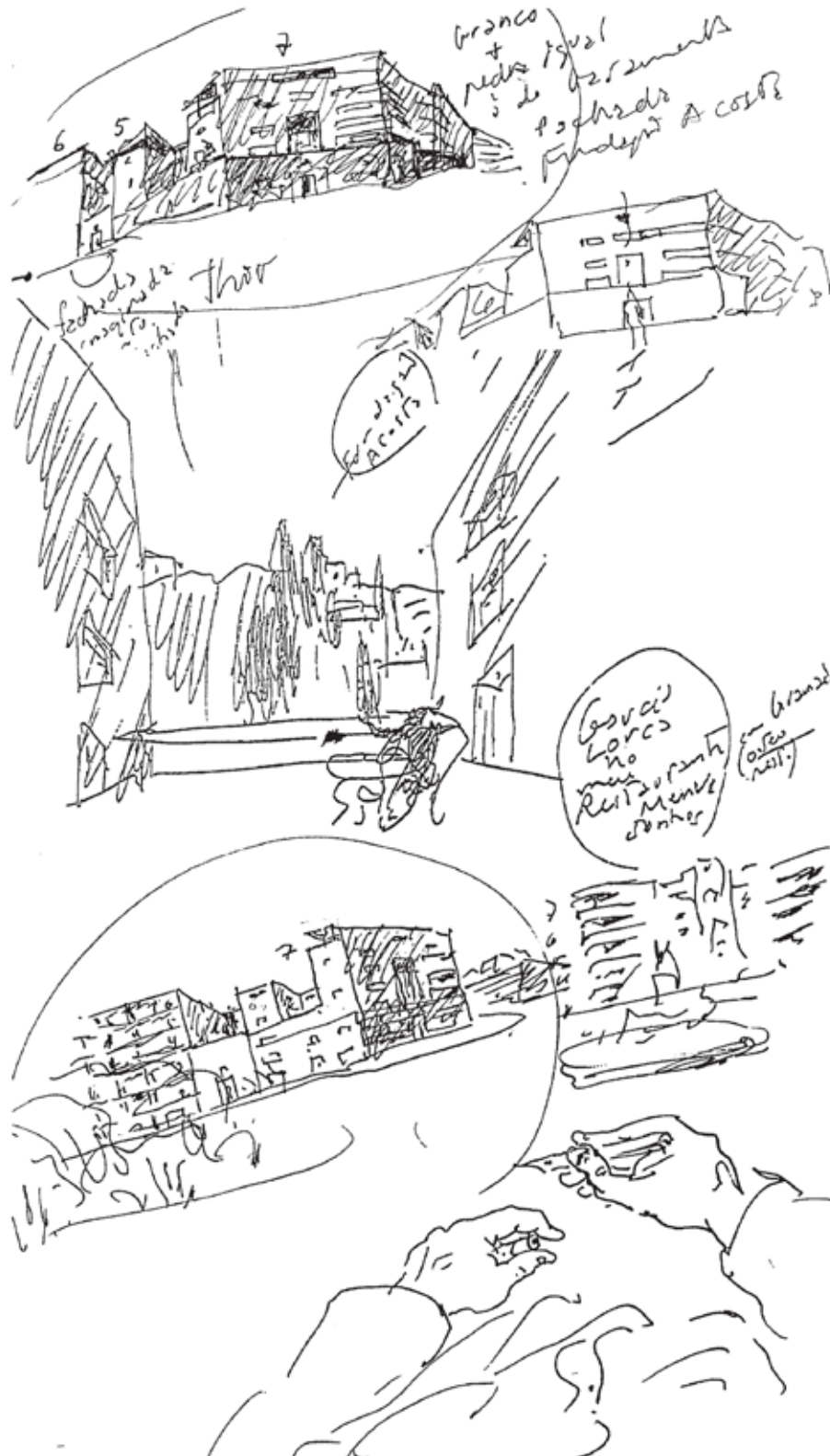


Fig.1 – Álvaro Siza Vieira, Zaida Building and Patio House, Granada

second, this “drawing” is here understood as a form of representation (Purcell & Gero, 1998), that is, a process or a medium and not as a produced thing (Williams & Sanchez-Del-Valle, 2008).

According to Siza Vieira (in Somoza, 2007), sketching is “only” an instrument for the designer, “a working instrument”. Also Anthony Vidler (2000) underlines that the drawing in architecture – both sketching and precision hand drawing – has always had a peripheral or marginal connotation in relation to the other arts, precisely because it is a means and not an end – and therefore it has no artistic value *per se*. The Vidler’s perspective, although it may be debatable, highlights that the value of drawing in architecture, due to its instrumental character, is determined by whether or not it is suitable for its purpose.

This understanding of sketching as a medium supports the idea that anyone can learn it, as an “autonomous form of language” (Siza Vieira, 2009), and not as an innate talent restricted to a small group. In fact, several authors are aligned with this idea. The French architect and theorist Jean-Nicolas-Louis Durand (1760-1834) argues that “drawing is the natural language of architecture; every language, to fulfil its object, should be perfectly in harmony with the ideas of which it is the expression” (in Vidler, 2000: 10). In the same way, the Brazilian architect João Vilanova Artigas refers that “to draw, you need talent, imagination, vocation. Nothing could be further from the truth. Drawing is language [...] and while language is accessible to everyone” (in Figueiredo, 2015: 75).

However, despite recognizing that sketching plays a key role in architectural education, Siza Vieira (2009) argues that it is not indispensable to design: “other instruments can be used by the architect; but none will replace sketching without any loss, just as sketching cannot replace the others” (2009: 37).

## 2. The purposes of sketching

According to Siza Viera (2009), the designer uses sketching essentially to support design, this is its main purpose. However, it is possible to particularize some functions of sketching in the design processes, such as perception, analysis, synthesis and communication (Have & Toorn,

2012). Although these functions constitute the whole of the design and are therefore related, they have their own autonomy and characteristics, and can be organized as follows: 1. sketching as recognition, through perception and analysis; 2. sketching as transformation, through synthesis; 3. sketching as presentation, through communication.

Daniel Herbert (1988) recognizes in the sketches of the first two groups – recognition and transformation – a private character. These sketches serve mainly the designer, are produced by him and for him in the development of design. On the other hand, Herbert (1988) characterizes the sketches of the third group – presentation – as public, since they serve to make known intentions, ideas, or the design itself to others. However, the author argues that these categories are not fixed and closed: a private sketch, produced as a study sketch, can become public and thus change its purpose. In fact, as mentioned by Tversky and Suwa (2009), the possibility of migration between public and private domains is one of the qualities of sketching as a form of representation, facilitating or enriching communication and collaboration – Siza Vieira’s sketches are a good example of this feature.

## 3. The particularities of sketching

What are the characteristics of sketching that guarantee its effectiveness as an instrument to support design? According to Goldschmidt (1991), especially in the conceptual phases, the form of representation chosen must allow the design process – that is, the interaction between internal and external representations (Milovanovic, 2019) – to be fluid and uninterrupted. In this sense, Goldschmidt (1991) states five characteristics of a form of representation that can be considered qualities in the design process: speed of production, minimal generation rules, tolerance to ambiguity, inaccuracy and incompleteness, transformability and reversibility, and flexible stop-rules. Sketching seems to be the form of representation that brings together most of these characteristics (Goldschmidt, 1991).

Considering the qualities of sketching, Tversky and Suwa (2009) also underline the speed of production, the requirement of few cognitive resources or generation rules, as well as ambiguity – ambiguity in sketches, instead of



Fig.2 – Álvaro Siza Vieira, Venice

promoting confusion, they promote innovation (Tversky and Suwa, 2009; Lyn and Dulancy, 2009). To these characteristics-qualities, Tversky and Suwa (2009) also add the possibility of focusing on some aspects without losing the general sense, the possibility of exaggerating, emphasizing or distorting aspects or elements of the design – thus, related to expression –, and finally the possibility of acquiring a public nature, even when fulfilling an initial private purpose.

#### 4. Sketching as recognition

As already mentioned, the recognition procedures as a way to acquire knowledge of the world, are part of the design processes. In fact, as Siza Vieira (2009) argues, the in-depth knowledge of things and their relationships is a fundamental step for those who wish to intervene in them. Perception and analysis are the functions of sketching as recognition and differ essentially in the type of relationship with the observer: while in perception there is a clear link with the observer's point of view, the analysis operates in abstraction, using systems of representation that transcend the visible dimension, such as plans, sections, axonometries or aerial perspectives.

Sketching is understood by Siza Vieira (2000, 2003, 2009, 2018) and by several authors as a way of seeing. This idea was already expressed by Le Corbuiser in his famous sentence: "to draw is to learn to see [...] you have to draw to push inside what has been seen and will then remain forever in our memory" (in Danièle, 2015: 23). The contributions of Joaquim Vieira (1995) and Alberto Carneiro (1995) can help to clarify this position.

First, as referred by Vieira (1995: 38), since sketching implies a "slow, quiet, absorbing and involving" observation, it will allow the observer to discover "unsuspected levels of relationships with things, beings and their identities". Second, as referred by Carneiro (1995: 15), the physical act of drawing requires a deep understanding of the visible, "immediately structuring the fields of meaning for the images and the corresponding figures", in order to determine "the typological articulations, the category and the expression of our sensitive apprehension of the outside world". This is an important aspect in the educational context, since errors in students' drawings often correspond to difficulties in understanding the observed object (Lyn and Dulancy, 2009). Finally, according

to Vieira (1995: 90), the examination of the produced image in relation to the observed reality, seems to be "the key to a privileged perception".

#### 5. Sketching as transformation

Purcell and Gero (1998) underline the importance of less structured forms of representation such as sketching as a cognitive support tool to design. This idea is frequently formulated as "sketching is a cognitive instrument" or simply "sketching is thinking" (Goldschmidt, 1989, 1991, 2014, 2017; Herbert, 1988; Milovanovic, 2019; Milovanovic & Gero, 2020; Purcell & Gero, 1998; Tversky & Suwa, 2009; Williams & SanchezDel-Valle, 2008).

According to Self and Goldschmidt (2018) there is a conviction that sketching is not a way of externalizing pre-existing ideas, but part of an interaction between internal representations and their external expressions. As opposed to the classic notion of designing as a linear and sequential path in which the designer thinks first and then draws, the idea presented here is that the designer thinks through drawing.

Self and Goldschmidt (2018) argue that no design is conceived in the designer's mind, since it is not possible to deal in abstract with the quantity and complexity of the properties of the design elements. Therefore, it is necessary for the designer to resort to external representations – or transition artefacts, as Herbert (1988) refers – that support the design process. In this way, sketching works as a graphic record or as a memory aid (Purcell & Gero, 1998).

There are two aspects to consider in the relationship between designer and sketching from a cognitive point of view. First, as Goldschmidt (1991) argues, the designer establishes a dialogue with the produced representations – this perspective is also in line with Donald Schön's (1992) proposal of designing as a "reflexive conversation". Working as visual devices, the self generated sketches talks back, returning information that the designer did not put there intentionally or consciously (Suwa, Gero & Purcell). Second, as defended by Herbert (1988), the discoveries emerge from the very physical act of sketching, since the need to externalize a set of ideas, forces a specific organization of the elements of thought.

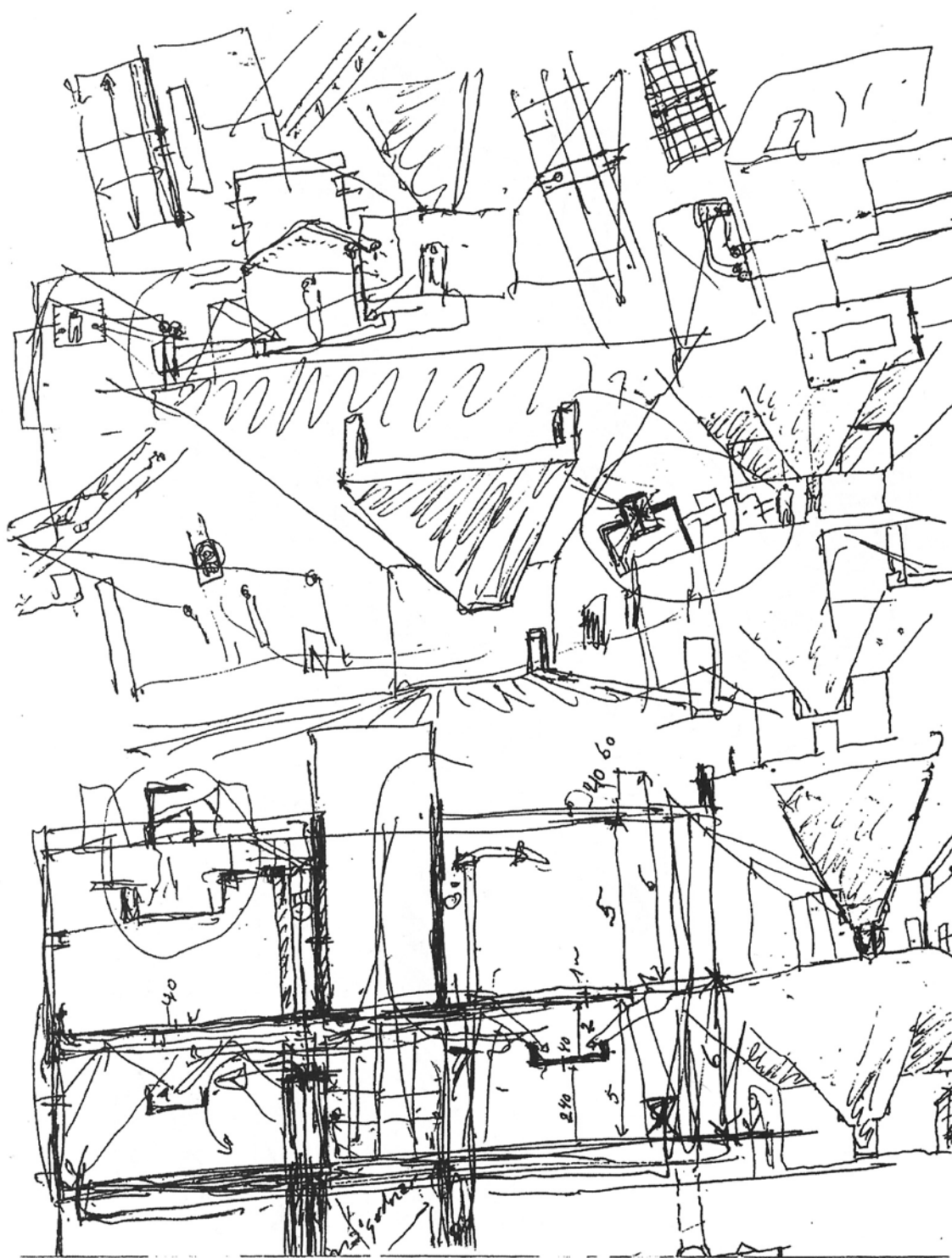


Fig.3 – Álvaro Siza Vieira, Galician Centre of Contemporary Art, Santiago de Compostela

## 6. Sketching as presentation

From an educational point of view, the communicative dimension of sketching is particularly relevant (Sousa Santos et al, 2020). As Milovanovic (2019: 27) argues, the set of external representations produced by students “is a key element in the pedagogical situation of design critiques”: the interaction between professors and students is channelled through the representations used during the design critiques (Milovanovic, 2019).

What happens is that the student’s external representations, in addition to serving the designing process itself, also serve as a record of the mental path taken, and above all as a support for discussion and collaboration between them: as a “trading platform”, which Milovanovic (2019) refers to as the “representational ecosystem”.

The concept of “representational ecosystem” is proposed by Dorta, Kinayoglu, and Boudhrea (2016) as the set of produced external representations – including sketches, but also diagrams, plans, sections, mock-ups, digital models, simulations and animations of the design object – and their inter relationships, functioning as an “environment for the interaction” between students and professors (Milovanovic, 2019). An important aspect of this interaction is also the representations produced by professors during design critiques, where sketching remains a privileged instrument (Sousa Santos et al, 2020).

## Conclusion

With this article it was intended to approach sketching as a form of representation and its relationship with design in architectural education. First, the nature of sketching was recognized, underlining its instrumental character, as an autonomous form of language and not as a skill. This means that it is possible for anyone to learn it. Second, it was identified that the main purpose of sketching in architecture is to support the design process, considering three procedures: recognition, transformation and presentation. Third, the particularities of sketching as a design instrument were enunciated, such as: speed, tolerance to ambiguity, transformability, or the expressive dimension of exaggerating, emphasizing or distorting. Fourth, considering the recognition procedures, the idea of sketching as seeing was addressed, as well as the factors that may explain it. Fifth, taking

into account the transformation procedures, the idea of sketching as thinking was considered: sketching does not serve to externalize preconceived ideas, it serves to elaborate the ideas themselves. Some characteristics of sketching were later identified from a cognitive point of view. Finally, the importance of the communicative dimension of sketching in the educational context was recognized. The students’ external representations are a key element in design critiques, since they function as a platform for interaction with professors.

It seems possible to conclude that sketching as a form of representation brings together a set of relevant qualities to support the design processes, especially within architectural education. In such a way that Lyn and Dulancy (2009) establish a relationship between the ability to draw and the ability to design. In fact, sketching is generally valued by professors in relation to other forms of representation (Purcell & Gero, 1998). However, in the last decades, sketching or hand drawing has been progressively disappeared from architectural curriculum plans (Have & Toorn). In many cases, it seems that it only persists to avoid the feeling of loss of disciplinary identity (Lyn & Dulancy, 2009). Research can contribute to reflect on the role of sketching in design teaching and in the overall training of the architect. For this, as stated by Pucell and Gero (1998), future work must pass through the collection and analysis of empirical evidence, relatively scarce on the role of sketching and other less structured forms of representation in the design processes.

## Images

Fig.1 – Álvaro Siza Vieira, Zaida Building and Patio House, Granada – Source: (2000). Álvaro Siza 1958-2000: Getting through turbulence notes on invention. Madrid, El Croquis.

Fig.2 – Álvaro Siza Vieira, Venice – Source: Siza Vieira, Á. (2000). Imaginar a evidência. Lisbon, Edições 70.

Fig.3 – Álvaro Siza Vieira, Galician Centre of Contemporary Art, Santiago de Compostela – Source: Siza Vieira, Á. (2000). Imaginar a evidência. Lisbon, Edições 70.

Fig.4 – Álvaro Siza Vieira, Municipal Library, Viana do Castelo – Source: (2000). Álvaro Siza 1958-2000: Getting through turbulence notes on invention. Madrid, El Croquis.

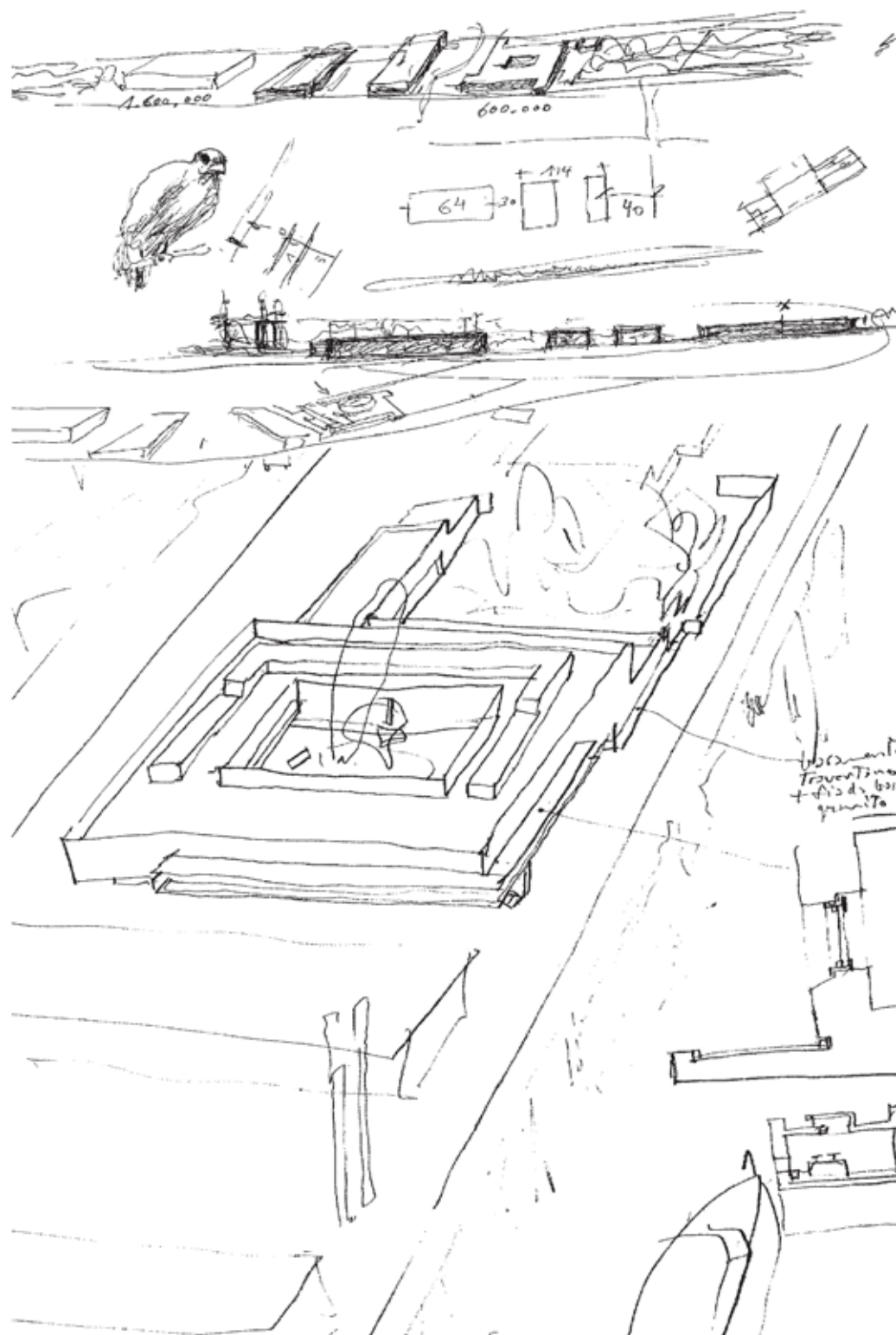


Fig.4 - Álvaro Siza Vieira, Municipal Library, Viana do Castelo



## References

- Carneiro, A. (1995). Campo sujeito e representação no ensino e na prática de desenho-projecto. Porto: FAUP.
- Danièle, P. (2015). *Le Corbusier Et Le Dessin: Ce Labeur Secret*. Lyon: Fage Éditions.
- Schön, D. (1992). Designing as reflective conversation with the materials of a design situation. *Knowledge-Based Systems*, 5, 3-14.
- Dorta, T., Kinayoglu, G., & Boudhraa, S. (2016). A new representational ecosystem for design teaching in the studio. *Design Studies*, 47, 164-186.
- Figueiredo, R. (2015). *Do lugar vivido ao lugar imaginado: O desenho e a arquitectura*. (MSc thesis). Universidade Católica Portuguesa.
- Goldschmidt, G. (1989). Problem representation versus domain of solution in architectural design teaching. *Journal of architectural and planning research*, 204-215.
- Goldschmidt, G. (1991). The Dialectics of Sketching. *Creativity Research Journal*, 4, 123-143.
- Goldschmidt, G. (2017). Manual sketching: Why is it still relevant? In S. Ammon & R. Capdevila-Werning, *The Active Image: Architecture and Engineering in the Age of Modeling*. Cham: Springer.
- Have, R., & Toorn, M. (2012). The role of hand drawing in basic design education in the digital age. Paper presented at the International Conference on Engineering and Mathematics, ENMA 2012.
- Herbert, D. (1988). Study Drawings in Architectural Design: Their Properties as a Graphic Medium. *Journal of Architectural Education*, 41, 26-38.
- Lyn, F., & Dulaney, R. (2009). A case for drawing. *ARCC Journal*, 6 (1), 23-30.
- Milovanovic, J. (2019). *Exploration of architectural design studio pedagogy: Effect of representational ecosystems on design critiques*. (PhD thesis). Loire Bretagne University.
- Milovanovic, J., & Gero, J. (2020). *Modeling Design Studio Pedagogy: A Mentored Reflective Practice*. Paper presented at the International Design Conference - Design 2020.
- Purcell, A., & Gero, J. (1998). Drawings and the design process. *Design Studies*, 19, 389-430.
- Self, J., & Goldschmidt, G. (2018). Sketch Representation and Design as Generative Transformation. In P. Vermaas & S. Vial (Eds.), *Advancements in the Philosophy of Design*. Cham: Springer.
- Siza Vieira, Á. (2000). *Imaginar a evidência*. Lisbon: Edições 70.
- Siza Vieira, Á. (2003). *Sulla pedagogia*. Casabella 770, 3-5.
- Siza Vieira, Á. (2009). *01 textos*. Porto: Civilização.
- Siza Vieira, Á. (2018). *02 textos*. Lisbon: Parceria A. M. Pereira.
- Somoza, M. (2007). *Álvaro Siza conversas no obradoiro*. Ourense: Verlibros.
- Sousa Santos, R., Pimenta do Vale, C., Bogoni, B., & Kirkegaard, P. H. (2020) *The Forms of Representation in Architectural Design Teaching: The cases of AUIC-POLIMI and FAUP*. SIGraDi 2020 Transformative Design, Medellín, Colombia. Blucher: 726-733.
- Suwa, M., Gero, J., & Purcell, A. (1988). The Roles of Sketches in Early Conceptual Design Processes. Paper presented at the Proceedings of Twentieth Annual Meeting of the Cognitive Science Society.
- Tversky, B., & Suwa, M. (2009). Thinking with sketches. In A. Markman & K. Wood (Eds.), *Tools for Innovation*. Oxford: Oxford Scholarship Online.
- Vidler, A. (2000). *Diagrams of Diagrams: Architectural Abstraction and Modern Representation*. Representations 72, 1-20.
- Vieira, J. (1995). *O Desenho e o projecto são o mesmo? Outros textos de desenho*. Porto: FAUP.
- Williams, D.-O., & Sanchez-Del-Valle, C. (2008). *Overlaps, Boundaries and Continuities: Transforming Sketch*. Paper presented at the Seeking the City: Visionaries on the Margins - Proceedings from the 96th ACSA Annual Meeting, Washington, DC.