Thinking, drawing and writing architecture through metaphor

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Abstract

Metaphor is a critical component of being an architect: it mediates the various stages involved in architectural design, motivates a large part of the jargon used in the discipline, and is consistently used as a rhetorical strategy in many of the genres articulating architectural communication. Given its importance in architectural practice and discourse, the teaching of metaphor should be included in the syllabi of English for Specific Purposes (ESP) courses taught at polytechnic schools. The purpose of this paper is twofold. On the one hand, I describe how various metaphors inform architects' practice – from the first design phase to the post-construction assessment distributed in one of the most popular genres in the community; that is, the architectural review. Drawing insights from cognitive and genre research into the role of metaphor in the discipline, I then suggest ways in which metaphorical competence can be fostered in ESP courses aiming at facilitating the students' gradual enculturation process into their future community of practice.

Keywords: metaphor, architecture, genre, disciplinary acculturation, ESP pedagogy.

Resumen

Pensando, dibujando y escribiendo arquitectura mediante la metáfora

La metáfora es un componente esencial del trabajo de los arquitectos: interviene en las distintas fases del diseño de un proyecto, motiva una gran parte de la jerga de la profesión, y es una de las estrategias más recurrentes en muchos de los géneros que conforman el discurso de la arquitectura. Dada su importancia en la práctica y la interacción comunicativa de los arquitectos, la metáfora también debería formar parte de los programas de inglés como lengua específica (IFE) que se enseñan en las escuelas politécnicas. En este sentido, los objetivos de este

artículo son dos. En primer lugar, se describe el papel de la metáfora en la práctica de la arquitectura – empezando por la fase de diseño de edificios y acabando en la evaluación de los mismos en uno de los géneros más populares del discurso arquitectónico: la reseña de arquitectura. A partir de esta descripción de la metáfora como mecanismo cognitivo y de su uso en dicho género, se hace una propuesta que contribuya a fomentar la competencia metafórica de los estudiantes de arquitectura en cursos de IFE entendiendo que dicha competencia puede contribuir a que hagan suyos los conocimientos y prácticas característicos de su futura comunidad profesional.

Palabras clave: metáfora, arquitectura, género, asimilación disciplinar, pedagogía IFE.

Introduction

In 1991 the Spanish magazine *El Croquis* published the article "Como acotar un croissant" (*How to lay out a croissant*) in which architects Eva Prats and Enric Miralles explained, in graphic and verbal form, how to decompose the orthogonal geometry hidden in the many folds of this pastry roll (see Appendix). Twenty years later, we find the croissant example in the programmes of subjects dealing with architectural composition in schools of architecture (e.g. the University of Buffalo or the School of Architecture of Barcelona ETSAB).[1]

The text is interesting in several respects. First, it points to the associative or figurative quality of architectural design – that is, architects' consistent use of non-architectural entities when designing spatial artefacts. Second, by verbally explaining what is displayed in graphic form, the text underlines the importance of language in a discipline often regarded as an exclusively visual affair. Interestingly, both language and images often exhibit the same degree of figurativeness: on the one hand, the architects use a croissant to explore composition and dimensionality transformations – that is, two operations involved in architectural design; on the other, the expressions "a surface wraps itself", "half moon", "constellations of centerpoints" or "tangents" used for describing the croissant itself – and by extension, any building informed by this pastry – are also figurative. Moreover, although the text belongs to a Spanish magazine, it is also rendered in English, thus illustrating the status of this language as a lingua franca in the discipline – as also attested by architectural magazines worldwide. Finally, the text shows, step by step, how the topological properties of an everyday entity can be

abstracted for their further translation into spatial terms – that is, how it is actually done. In short, the croissant example nicely points to the figurative, multimodal – verbal and visual – and enactive quality of architectural design.

In the present paper I describe the role and function of metaphor in the discourse of architects in order to suggest ways in which research into its textual and communicative function can be integrated in ESP courses for architecture undergraduates. The basic assumptions are that (a) metaphorical "competence" is critical in the architectural realm and, therefore, needs to be explicitly taught; and (b) its introduction in the classroom must involve both images and language as well as action-based or enactive activities in order to be fully effective and compliant with what happens in the discipline.

The reasons underlying this agenda are two. First, unlike other fields where metaphor may play a supporting role, in architecture metaphor is critical: together with being part of the discipline's theoretical repository (Forty, 2000), it informs all the stages of designing a building as well as the language used to discuss it (with clients, colleagues, etc.) before, during and after its construction where it motivates jargon terms (for example, "skin", "cladding" or "sawtooth roof") or language describing spatial arrangements as "crouching creatures" in more innovative terms.[2] Therefore, ESP courses should promote the acquisition of metaphorical competence in order to facilitate the learners' enculturation process and gradual insertion in their chosen disciplinary community. The second reason lies in the very competences, objectives and strategies included in the syllabi of architecture degrees,[3] among which we find:

- competences dealing with spatial vision, creativity and imagination, critical reasoning, oral and written communication (both in Spanish and English), conception and representation of the visual properties of objects and spaces, assessment of finished artefacts, and engagement in architectural criticism;

- objectives concerned with the study and knowledge of (a) form as image and structure – models, types and relationships between form and meaning, symbolic processes, etc.; (b) representation and interpretation processes; (c) ways of looking: perceiving and describing; (d) abstraction as a means to identify the inherent properties of objects, and, most interestingly; (e) architectural criticism;

- strategies aimed at the acquisition of techniques involving analogy and imaginative processes, and at familiarizing students with reading and writing about architectural topics.

All these reveal an awareness of the importance of training architecture undergraduates in acquiring those cognitive and discursive skills most relevant for their chosen disciplinary community. Not only is metaphor one such skill (as suggested by descriptors like "creativity", "imagination" or "symbolic processes"), but is an intrinsic component of architects' thought and language. In the following section I show how metaphor is used in architectural design as well as in texts concerned with post-construction assessment – in many ways, the two sides of the same coin.

Metaphor in architecture

The present discussion draws upon my previous work on metaphor in the discourse of architects (Caballero, 2006, 2009 & 2013; Caballero & Paradis, 2013). Combining insights from Conceptual Metaphor Theory (CMT) and Genre Analysis after the seminal work of Lakoff and Johnson (1980 & 1999) and Swales (1990) respectively, I described metaphor's contribution to furnishing architects with a system for thinking and discussing built space in the architectural reviews (hereafter ARs); that is, one of the most popular genres in architectural discourse and regarded as "a central and invaluable tool in architectural education – in the basic teaching of design, as well as in the production of reflexive, informed, and discerning professional graduates" (Stead, 2003).

Concerning the "thinking" aspect, metaphor has been regarded as a design trigger or primary generator (Darke, 1979; Oxman, 1999; Goldschmidt & Sever, 2011). Plowright (2014) provides a more straightforward description of the value of metaphor in architecture – and one which is congruent with CMT views on metaphor. He describes architectural design itself as a domain-to-domain transfer whereby outside knowledge is mapped or translated into architecture-specific inside knowledge – an operation which, if done well, enriches and reinforces the architectural content or, in CMT terms, domain. Simply put, the ability to integrate – that is, map – knowledge across domains lies at the very core of creativity in both metaphor and architectural design. This integration of seemingly disparate ideas into architectural solutions is also acknowledged by practitioners themselves. The

following example shows architect Zvi Hecker explaining how his Heinz-Galinski school in Berlin started to take shape and gradually evolved during its construction:[4]

> A drawing of the geometry of a sunflower was given to me (…) It demonstrated how the spirals determine the growth of the sunflower seeds, and that the spiral proceeds in the golden progression (…) The Jewish School in Berlin provided me with the opportunity to pursue my fascination with the phenomenon of the sunflower's phenomena a little bit further: adapted to fit the program of the school, the sunflower lost much of its precise geometrical structure, but it retained its dynamic and organic character (…) The sunflower's celestial construction seemed most suitable for planning the school, since its seeds orbit the sun and the sun rays illuminate all of the schoolrooms. In time it became evident that the school, whilst under construction, was gradually transforming into an intricate city. Streets and courtyards followed the paths of the orbits and the infinitesimal traces of the sun rays. (…) The building was nearing completion when an uncertainty arose. By now the construction resembled neither a sunflower nor a city but a book whose open pages carry the load of the construction. (…) Following a lengthy Talmudic debate, the school was eventually found to be built correctly. It was acknowledged that the sunflower, when transplanted from the Holy Land to Berlin evolved naturally into a book. The experts declared that the transformation was unavoidable since the Book represented the only lot Jews were allowed to cultivate in the Diaspora.
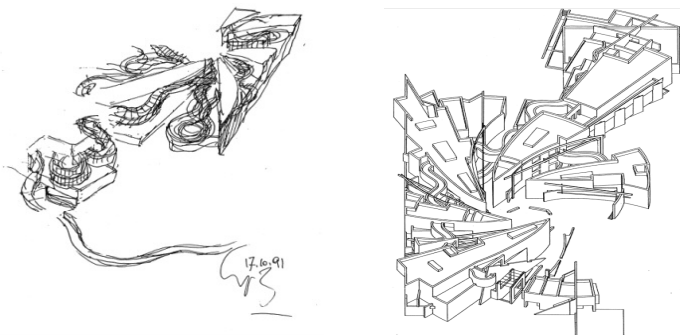
Figures 1 & 2. Sketch and axonometry of Heinz-Galinski school.

Not only do architects often think in metaphors when approaching a new design, but such metaphors are translated into verbal and graphic form. This

is illustrated in Figures 1 and 2 where Hecker's sunflower may be discerned in the sketch and the axonometric drawing as well as in the language used by the architect. Interestingly, this is not the only metaphor involved in this building: the school started as a "sunflower", yet turned into "an intricate city" and ended up being "a book". This mixture of metaphors reflects the evolution of the architect's ideas along different construction phases as well as the various properties of the finished building – from its visual traits to the more abstract and/or symbolic concerns underlying its design. However, despite the architect's explanation of how the three metaphors cohere into his building, the school is known as "the Sunflower", and this is also the visual metaphor mostly used by those architects – design scholars, reviewers, and so forth – who have commented upon the building in specialized architectural publications.

Hecker's quote above also indirectly addresses one of the most controversial issues in metaphor research; that is, the difficulties derived from distinguishing between visual and non-visual knowledge and, accordingly, between image metaphors and conceptual metaphors as customarily done in CMT. Thus, conceptual metaphors have been defined as resulting from mapping conceptual knowledge and being mainly concerned with providing ontological status and structure to typically abstract concepts and activities (for example, "a tightly-knit neighbourhood" or "the architect stitched the new to the old" instantiating SPATIAL ARTEFACTS/ARRANGEMENTS ARE CLOTH and BUILDING IS WEAVING respectively). In contrast, image metaphors are described as mapping conventional mental images onto other conventional mental images by virtue of their similar appearance (for example, "The building is a jagged fan of five overscaled concrete fins"). However relevant the distinction may be for discussing the ways architects construe their specific world, drawing the line between visual and conceptual knowledge in the discipline is not easy. Indeed, by claiming that "the sunflower lost much of its precise geometrical structure" and alluding to those other traits which do remain in his building after the initial sunflower metaphor, Hecker is acknowledging the complex nature of the process of thinking a building and translating it into three-dimensional space. Put differently, despite the graphic slant of architects' work, overemphasizing the visual at the expense of the conceptual would hugely overlook the fact that the former is always linked to the latter and vice versa. As it is, Hecker's drawing upon a sunflower seems to combine both "types" of knowledge, since together with its "geometry", he liked the flower's "celestial" traits and the fact that "its seeds

orbit the sun and the sun rays illuminate all of the schoolrooms". Although the architect's initial interest lies in the visual traits of a sunflower, this gives way to more abstract concerns dealing with celestial, symbolic and dynamic notions suggested by its shape, which Hecker ends up relating to education – that is, an abstract concept. The information carried by different metaphors and the way these are used in the discipline is the topic of the following section.

Metaphor and architectural jargon

Metaphor is part of architects' theoretical repository, underpinning the complex knowledge schemas to be acquired in their long training. For instance, notions of built space articulated by biology or mechanistic metaphors are part and parcel of architects' disciplinary acculturation and, therefore, conventional and automatic within the discipline (see also the discussion on engineering metaphors in Roldán-Riejos & Úbeda-Mansilla, 2006 & 2013; Roldán-Riejos, Úbeda Mansilla & Santiago López, 2011). This is best illustrated by some of the jargon used for talking about the functional and structural properties of buildings ("spine", "bowels", "mechanics"), the way they are spatially arranged ("rhythm"), their problems and "pathologies" ("fatigue", "blister", "bleeding"), and their external appearance ("muscular", "feminine", "sinewy"). In turn, language metaphors are more focused on architects' work and the discipline per se; that is, underlie such conventional expressions as "vernacular" architecture or architectural "genre(s)", "syntax", "semantics", "vocabulary" or "rhetoric", all of which foreground the "intertextual" dimension of architects' work as well as their compliance with a set of combinatory rules and conventions. Table 1 shows some of the metaphors informing architectural jargon.

In agreement with the characteristics of the discipline, some metaphorical jargon carries visual information ("cross tee", "I-beam", "I-joist"), other terms are exclusively concerned with buildings' functional, abstract properties ("fatigue"), and some lexis combines visual and functional knowledge ("skin", "skeleton", "rib"). However, as pointed out earlier, the properties of built artefacts cannot be compartmentalized into form versus function – alone or in combination. Rather, built space is also characterized by sensory information related to mass, texture, luminosity, sound, or smell. In other words, experiencing architecture brings in properties related to what

buildings 'feel' like, that is, is a holistic, enactive or embodied and multimodal experience.

Source domains	Metaphors and Examples
ORGANIC	BUILDINGS ARE LIVING ORGANISMS *skin, membrane, skeleton, rib, haunch, hip, bowels, blister, fatigue*
TEXTILES	ARCHITECTURAL PRACTICE IS CLOTH MAKING *stitch, weave, thread, knit* BUILDINGS/CITIES ARE CLOTH *city's/building's fabric, tightly-knit* (spaces) BUILDING ELEMENTS ARE PIECES OF CLOTH/CLOTHING *clad(ding), jacket(ing), sheath(ing), sheet(ing), curtain wall, apron, sleeve*
LANGUAGE	ARCHITECTURE IS LANGUAGE *imagery, lexicon, vocabulary, syntax, idiom, rhetoric* BUILDINGS ARE TEXTS *vernacular*
MACHINE	BUILDINGS ARE MACHINES *mechanisms, mechanics* ARCHITECTURAL PRACTICE IS MUSICAL PRACTICE *choreograph, orchestrate* BUILDINGS ARE MUSICAL PIECES *rhythm*
SHAPES & 3-D OBJECTS	*I-beam, I-joist, J channel, V-truss* *butterfly/sawtooth roof, half-barrel/barrel/corbel/fan/groin/net/spiral vault*

Table 1. Metaphorically motivated jargon.

This may be illustrated by qualifiers such as "crisp" or "rugged" and music- and textile-informed nouns such as "fabric", "grain" or "rhythm", all of which express buildings' textural properties by blending distal (sight, sound) and proximal (touch) perceptual experiences in the same expression. Indeed, architectural texture is not relegated to what can be felt with the human hand: standard definitions of texture cover both the tactile and visual quality of buildings' surfaces (Harris, 2006); accordingly, when architects design a building they also consider "optical texture" (e.g. the façade of the Palazzo Medici in Florence illustrates this property as resulting from, yet not limited to, rhythm, repetition, and the use of material).[5] A final example illustrating architects' sensory concerns is "acoustical glare", i.e. the harsh quality of sound inside buildings caused by too flat and smooth walls or surfaces. This is shown in the passage below:

> Making Sense. (…) In our ocular-centric design culture, where does sound fit and how does it inform the development of domestic architecture? (…) The project advocates an aural-ocular design strategy, a way of thinking that enlists new technologies to provoke a set of enhanced social and sensory experiences in domestic space (...) MIX House integrates a new kind of window wall within an acoustic design that achieves a condition that we take

for granted in media: the integration of sound and image. By incorporating cutting-edge technologies with traditional acoustic principles, the project rethinks and extends the Modernist notion of visual transparency to include aural transparency as well. (Architectural Design, Vol. 78)

This sensuous approach to built spaces, which starts yet transcends what they look like, has led some architects to underline the role of the haptic system in experiencing three-dimensionality, i.e. the *sine qua non* of architecture (Bloomer & Moore, 1977; Pallasmaa, 2005 & 2009; see also Caballero & Paradis, 2013). Haptic experience is seen as simultaneously combining feeling and doing: it encompasses, directly or indirectly, most other senses and, particularly, motion since it is acquired through action – that is, it depends on motor skills. Given the critical status of the latter, architects' recurrent use of motion metaphors in order to describe buildings is far from surprising. Some of the figurative expressions thus informed instantiate the scenario MOVING WITHIN A BUILDING IS MAKING A JOURNEY whereby people's movement inside built spaces is described as a journey and those spaces are referred to as the buildings' "routes" (usually co-occurring with "circulation"), "itineraries", "paths", or "promenades". A second use of motion metaphors appears to be more concerned with verbalizing how people – often prospectively – feel buildings while interacting with and inside them – that is, it expresses a more holistic experience. Consider the following description of Steven Holl's *Cité de L'Océan et du Surf* in Biarritz:

> Holl understands the visceral thrill of communing with the ocean's rollicking power. Such experiences feed through into the muscular yet sensuous architecture, which cups and cradles visitors within the concrete wave. The curved platform also acts as a belvedere rising up to address the site and frame views to the distant western horizon where sea meets sky. This sense of compression and release is intended to suggest the experience of surfing. 'It's analogous to being on a rolling sea,' says Holl, 'when you dip down in a valley of water and are spatially enclosed (…) then the sea lifts you up and you can see in every direction.' (On the Beach in Biarritz with Steven Holl, The Architectural Review, September 2011)

Here the reviewer combines visual information, the building as a "concrete wave" or one of its parts as "rising up to address the site", with information less precise yet alluding to the sensual experience provided by its spaces, as explicitly pointed out by qualifying the ensemble as "sensuous architecture". For instance, "muscular" conveys both visual and haptic information, while

the verbs "cup" and "cradle" and the nouns "compression" and "release" attempt to capture what the building feels like when inside it. The ensuing explanation by the architect likening it to "being on a rolling sea" reinforces these ideas.

In short, metaphor is one of the cognitive and linguistic mechanisms whereby knowledge is construed, (re)codified, disseminated and, eventually, legitimized in architecture. One of the contexts typically involved in such endeavours is the genre of architectural reviews, as described in the following section.

Metaphor in post-construction genres: The architectural review

Metaphor also works as a rhetorical tool in the various genres articulating architectural communication. This is particularly noteworthy in post-construction texts such as ARs where the use of metaphor meets the genre's topical and rhetorical concerns. ARs are relatively short texts aimed at describing and evaluating built arrangements. Both goals underlie the textual organization of the genre, which is typically organized around three distinct sections: Introduction, Description, and Closing Evaluation. Each section is further structured in various textual sequences which are themselves organized in agreement with the way authors choose to accomplish their rhetorical goals. Figure 3 summarizes the genre's structure.

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TITLE + LEAD
INTRODUCTION
     Creating Context
     Introducing the building
     First evaluation of the building
DESCRIPTION
     Providing technical/budget/construction details of the building
     Outlining building's general organization and/or appearance (overall plan)
     Describing the parts/components of the building
     Highlighting parts/traits of the building
CLOSING EVALUATION
TECHNICAL CARD
VISUAL DATA + CAPTIONS
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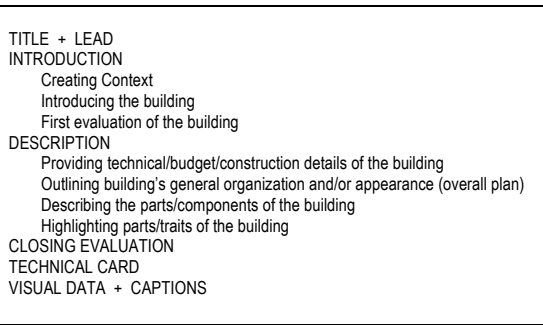
Figure 3. Rhetorical structure of the architectural review.

Regarding the topics covered in the texts, metaphor helps reviewers comment on (a) the architect's intervention by drawing upon seemingly related practices, for example ARCHITECTURAL PRACTICE IS CLOTH MAKING or MUSICAL PRACTICE as in architects' "weaving", "choreographing" or "orchestrating spaces"; (b) the buildings' external appearance, for example a building described as a "concrete wave" in the previous description of Steven Holl's *Cité de L'Océan et du Surf* in Biarritz; or (c) their functional properties, e.g. BUILDINGS ARE LIVING ORGANISMS with "breathing" needs and "bleeding" problems, or MACHINES (their "mechanics").

Of course, focusing on one aspect of buildings at the expense of others has rhetorical implications: by choosing and exploiting certain metaphors, reviewers foreground and/or downplay those aspects of the building at issue that best suit their own views and arguments. Put differently, metaphor is one of the strategies used by reviewers in order to textually reconstruct architectural projects as they like. Consider the following review of Hecker's Jewish school:

> The Sunflower Opens. A children's world was invaded on 15 September by political and media giants during the official opening of Zvi Hecker's Heinz-Galinski school in Berlin (…) At the centre of his geometrically extrapolated sunflower plan lies an open air foyer around which two- and three-storey 'petals', classroom, caretaker's house, sports and multi-purpose halls, swirl centrifugally, connected by 'snake' corridors and 'mountain' stairways. The reinforced concrete column and beam structure (…) Zvi Hecker has created a small city with open air and covered gathering points, private corners, alleys and cobbled courtyards. At every turn there are glimpses of trees and garden, choices of ways through or out of the building. He thinks of the school as 'a secret society (…) Zvi Hecker's plastic ensemble of forms has elements which although stationary and rooted in the earth seem to be in fluid and dynamic movement. Like a Citroën 2CV with playful and detachable parts, as opposed to a sleek Mercedes, it has human scale and does not intimidate the user. Zvi Hecker himself remarked, on seeing his school from the air, that the roofscape looked like a friendly meeting of whales. Shapes and volumes within the building arouse many topographical, animal and plant associative thoughts, and as Hecker has said, 'education is about broadening children's horizons, through a harmonious development of their mind, their soul, their body. It is an organic process and should take place in an organic environment.' (Layla Dawson, The Architectural Review, November 1995)

This critic endorses Hecker's sunflower metaphor, using it to open the text as well as in the description of the building: its plan is a "geometrically extrapolated sunflower" and its internal spaces are "two- and three-storey 'petals'" which "swirl centrifugally" – the latter alluding to Hecker's explanation of his choice of metaphor. This is mixed with the more *ad-hoc* expressions "snake corridors" and "mountain stairways" after their shape. In order to evaluate the building, the reviewer abandons the sunflower metaphor and uses the metaphorical simile "like a Citroën 2CV with playful and detachable parts", presenting the building as humane and friendly rather than intimidating. These qualities are reinforced by quoting the architect's views on the school's roof as looking "like a friendly meeting of whales", a comment which, as happens with the reviewer's, is mainly concerned with visual information (for a detailed discussion, see Caballero, 2013). The review published one year later, follows a different strategy:

> Scholastic sunflower. In the first Jewish school built in Berlin since the Nazi times, Zvi Hecker has used his obsession with geometry to generate a network of memorable particular places to act as a humane backdrop to education. [The building] is full of incident and exploitation of a local occurrence, full of nooks and crannies, full of subtle variations of shape and size: yet it is highly controlled. The "Sunflower" which is the generating idea is always traceable but not overbearing (…) In the process of walking around the building, the Mediterranean experience is remembered. The left-hand side (seen from the street) is a knife cut through the sunflower system (…) Turning round into the rear playground the sheer range of the parts and the knitted quality of the whole add to this. Of course, it is a town. What else could it be? And the total system reinforces the analogy. The radiating sweeps define "quartiers" and their streets, the "snakes", are a counter-movement, somewhat like a stream, the edges of the town have different physiognomies dependent upon circumstance: one tight, one heroic, one secret and one casually falling away. The quality of external space is of a series of localities. Hecker has exploited this internally (…) In his own words, Hecker wants the school to be a "big family house" rather than an institution. So there are several places in which he enjoys (and encourages) the fact that the kids can hide. He enjoys the fact that only the inmates really know all the routes through the building. Town rather than house (...) The Mediterranean characteristic pervades in the question of surface and incision. In only one part of the building does he (quite deliberately) offer a "standard" two-storey run of repeated rooms and window-and-spandrel architecture (…) It will be interesting to listen to the (inevitable) comparisons that will be made between the school and Libeskind's Jewish Museum. The latter is surely much more

of a citadel than this building. Yet symbolism and light preoccupy both (...) Surely an architect's interpretation of "Beth-Sepher" … the house of the book … which is its basic form, by the way. (Peter Cook, The Architectural Review, June 1996)

This reviewer also uses the sunflower metaphor to open the review, point to Hecker's original idea, and refer to the building's plan. Other visually-motivated language concerns reference to parts of the building as "a knife cut through the sunflower system," or as "snakes", and the final commentary quoting the architect's views of his building as "the house of the book" yet relating it to the school's external appearance. However, most commentary relies on an urban metaphor (again, drawing upon Hecker himself) whereby the school is equated to a "town" or "citadel", and its internal spaces are described as "localities", "quartiers", "edges" (of the town), and "routes" – all of them compliant with the aforementioned metaphor as well as articulating a virtual tour inside the building at the hands of the reviewer.

The way each review is crafted illustrates some of the negotiation strategies in architectural criticism which, in turn, respond to the multimodal quality of architectural texts where images not only play as important a role as verbal explanations, but are usually regarded as the true language of the discipline. The provision of visual information together with the audience's expertise and, hence, ability to interpret what is graphically shown determines the way critics couch their views in the texts. Typically, the use of scare quotes and similes draws attention to the interpretative – as opposed to the factual – quality of the reviewers' commentary and, by so doing, leave their readers free to interpret the building as they choose. As particularly illustrated in the previous review by Layla Dawson (*The Architectural Review*, November 1995), the fact that this usually happens with visually-motivated language suggests that reviewers are aware that their reference to spaces as, for instance, "petals," "snakes" or "mountains" may be potentially face-threatening for their visually literate audience and, therefore, that they are more ready to negotiate seeing than thinking. In contrast, less visual metaphorical language exhibits a more amodal and apparently objective quality fully compliant with the abstract information it conveys. Readers may also strongly disagree with such commentary, yet disagreement cannot be validated by means of images provided in the texts and, therefore, remains a personal, individual reaction to the critic's arguments. This is the case of the previous review by Peter Cook (*The Architectural Review*, June 1996): the reviewer appears to be mainly concerned with the dynamic, "civic," and experiential qualities of Hecker's

school, all of them symptomatic of good design, yet fairly "abstract" until actually experienced by the users of the building. Indeed, regardless of the architect's use of the town metaphor in his own texts, the schematic explanation in these contrasts with the reviewer's more elaborated portrayal, who interprets the architect's work in more detail. Put differently, the most "abstract" metaphors among those used by the architect to explain the evolution of his sunflower-building become the true rationale of the finished artefact at the hands of this particular reviewer. The fact that the metaphor originates in the architect under evaluation reinforces the reviewer's status as a valid interpreter and judge of his work within the architectural community. In short, metaphors in the AR genre not only help architect-critics to reconstruct all the complexities involved in three-dimensional, built space in a way that enables readers to better understand them, but are also first-order rhetorical strategies symptomatic of what Goodwin (1994) called a "professional vision".

The foregoing description has shown how metaphor informs architectural design, e.g. the thinking part of architects' work, the jargon used to refer to buildings and their parts, and their post-assessment at the hands of the architectural critics. The focus so far has been placed upon how fully-established – expert – members of the architectural community use metaphor. The question now is to determine how knowledge of this use may help promote metaphorical competence in ESP courses for architecture undergraduates.

Metaphor in architectural education

When reflecting upon ESP practices in the early 1980s, Widdowson (1983: 104) pointed out that "to learn to be an engineer must involve an initiation into ways of thinking and behaving which define that secondary sub-culture, and the use of language in this initiation is bound to conform to these sub-cultural conventions." These early views on the instrumental role of language in the training process of future professionals coincide with some of the goals of the current tertiary education context. A similar view can be found in Lave and Wenger (1991), Lantolf and Pavlenko (2001), and Norton (2001). Their ideas about the language classroom are summarized by Breen (2001: 8) as follows:

> We have identified the language classroom as a particular context of the learning process (…) it can be seen as a specific community of practice for learners which gravitates within the wider communities from which they come, and to which they seek membership. In this sense, a language class mediates between the learners being and becoming.

If, as these scholars claim, the needs of undergraduates are partly determined by the demands of their future professional life, the sooner these are covered, the better. Of course, this calls for the design of ESP courses that not only aim at building up the students' linguistic competence, but also prove meaningful within the whole degree – that is, they are related to the other subjects of the curriculum and, above all, address the skills and competences informing it. This involves making decisions on the topics that may be most useful for the students, the procedures to be adopted in introducing them in the language classroom, and the achievements expected of the students at the end of any such course.

As to the first question, the foregoing discussion suggests that metaphor is a relevant topic per se. This is reinforced by the emphasis placed upon creativity and imagination, symbolic processes, analogy, and imaginative processes in architectural degrees, which leads one to think that metaphor should be taught explicitly, rather than implicitly, in the architecture classroom. Similar claims towards the deliberate exploitation of metaphor in the second language classroom (whether this is ESP oriented or otherwise) have been advocated by both applied linguists (Cameron & Low, 1999; Charteris-Black, 2000; Henderson, 2000; Caballero, 2003; Littlemore & Low, 2006; Alejo, 2007; among others) as well as architecture scholars (Coyne, Snodgrass & Martin, 1994; Logan, 2007; Kanekar, 2010; Casakin, 2011). As to questions related to the teaching procedure and the expected results, these are intrinsically related to each other and are the focus of the next section.

Familiarizing students with architectural metaphors

Another look at the competences, objectives and strategies in architectural degrees listed earlier reveals the importance of training architecture students into visual thinking from the beginning. This is attested by the importance of subjects dealing with visual and topological concerns such as Drawing, Form Analysis etc. or by the introduction of the croissant activity (and related or similar ones) in the first year of architectural degrees, which

suggest that metaphors primarily concerned with visual knowledge should be taught first in an ESP course. Moreover, as discussed elsewhere (Caballero, 2003 & 2006), image or visual metaphors not only motivate a fair amount of architectural jargon (for instance, most typologies of building elements are thus informed), but are instantiated in patterns that are fairly easy grammar-wise, which is an advantage both for memorization, retrieval and use purposes. A related advantage is that image metaphors are particularly useful in architectural description – versus the more evaluative or argumentative potential of conceptual metaphors. Since description is more basic than the kind of critical thinking involved in evaluation, it seems reasonable to expect that images will be easier to spot in the texts, and also easier to use.

A final argument is that image metaphors rely, first and foremost, on physically immediate knowledge from typically recognisable entities topology-wise (sunflowers, croissants, and the like), all of which are easy to translate into spatial terms and, in contexts where English is a foreign language like Spain, into the official languages spoken in the classroom. Accordingly, this type of metaphor may be easier to recognise and understand than more elusive expressions describing structural arrangements in terms of musical pieces or textiles. Of course, in subsequent stages students will need to learn how visual data also trigger other types of sensory and abstract knowledge (for example, the notions of acoustical glare and optical texture introduced earlier); however, since the point of access for such information is always visual, starting what is first apprehended through the eyes seems to be the most sensible approach.

Among the goals to consider when designing activities based upon image metaphors, the most immediate are learning to: (a) relate verbal descriptions to visual information and report the information thus gathered both in verbal and drawn form (for example, translate what is verbally transmitted into sketches); (b) acquire visually-informed jargon (for example, typologies of building elements); (c) describe personal projects in agreement with their physical properties; and, whenever possible (d) explore the design possibilities afforded by similar and/or different non-architectural and explain how they might cohere into the same design in written and drawn form (for example, the use of both an open fan and an open book in the building described in the example provided in Figure 4).

As to the activities designed to meet those objectives, I would start with those focusing on receptive skills and would slowly proceed to integrate these with activities concerned with production. Thus, after the explicit introduction and explanation of a few metaphor "basics" involving image metaphors according to the teacher's informed views about their productivity, the students may be presented with activities dealing with:

- matching visual information (like plans, drawings, photographs) with linguistic description;

- matching linguistic description with visual information;

- spotting building/building parts reference terms, and constructive typologies in texts;

- grouping typologies according to visual criteria;

- writing the caption of a visual (schematic description);

- reconstructing building/building element through linguistic description;

- drawing building/building element from verbal description;

- describing a personal building project to classmates according to its external appearance.

Teachers could use illustrations like the one in Figure 4 (also by architect Zvi Hecker) plus their corresponding texts, and make the students match and/or discuss (depending on their proficiency level) what is represented in verbal and visual form:

> It is a jagged fan of five overscaled concrete fins webbed together by an entrance lobby, synagogue, and multipurpose hall (…) The architect likens the building to an open book, the five pages of which – the concrete fins – represent significant events in the history of Duisburg's Jewish population. One of the "pages" for instance, points directly at the site where the town's former synagogue stood before it was destroyed by the Nazis (…) Along the park, the pages of Hecker's book are heroically scaled, but as it butts up against the older houses, the building steps down around an intimate, irregular courtyard that creates a quiet, domestically scaled entrance (…) The synagogue proper, a truncated star with a blocky ark (…) is finished almost crudely (…) Architect Zvi Hecker likens Jewish cultural Center's oversized concrete fins to open hand or pages of book.
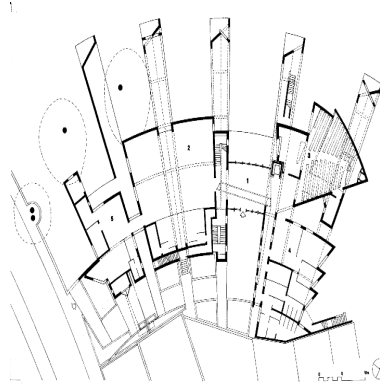
Figure 4. Illustration by Zvi Hecker for classroom work.

Once the students are sufficiently familiarized with visual metaphors, the next step is to introduce those dealing with more abstract – conceptual – knowledge, most of which are often used for evaluation and argumentation purposes and, hence, represent a step further in difficulty, maturity and, of course, language proficiency. This does not mean that visual metaphors should be dropped out of the syllabus since, as has been seen, metaphors often combine both visual and functional knowledge (particularly those concerned with buildings' support system such as "skeleton" or "rib").

Likewise, even if the activities are less visually concerned, this does not mean that students already master descriptive strategies and, therefore, the activities should not be concerned with description at all. Thus, many activities are similar to the ones proposed above, yet the emphasis is on promoting the undergraduates' higher-order cognitive processes, for instance their understanding of meaning as image-structure-meaning (architectural "syntax" and "semantics") beyond external appearance (even if it is first accessed through it), the shift from representation to interpretation, abstraction as a means to identify the inherent properties of objects (projects' "parti"; that is to say, their basic scheme or concept), non-visually motivated analogical reasoning, etc. The ultimate aim here is to foster the students' critical reasoning skills so that they can become evaluators themselves as well as engage in the post-construction evaluative practices typical of the discipline.

The teaching sequence here should be the same as the one suggested for image metaphor – that is, it starts from comprehension activities to gradually

move to production ones. Some of the objectives to cover are learning to: (a) use jargon concerned with "behaviour", function and/or structure; (b) describe the internal logic of personal projects; (c) build critical thinking abilities; and (d) evaluate – argue and counter-argue – personal as well as classmates' projects in oral or written form. The following are some of the activities that could help meet these objectives:

- Determining the topic of the text (Solution to a problem? Noteworthy building? etc. Why?).

- Spotting and discriminating descriptive stretches from evaluative ones, and determining whether the passages focus on the external or internal aspects of the building at issue.

- Reconstructing building's or building element's logic from its linguistic description.

- Drawing buildings internal organization (volume, mass, circulation) from verbal description.

- Assessing (describing and defending) a personal building project to classmates and teachers according to its functional/abstract properties orally (the crit genre) and in written form (in a short AR).

- Evaluating somebody else's building in oral and written form.

- Comparing various reviews of the same building.

As to the texts that may be used, these can include any description and/or evaluation of buildings dealing with metaphors other than those exclusively concerned with their physical appearance (typically, machine, organic, music or language metaphors), or reviews where controversy may arise between what is argued in the text and what is shown in the visuals accompanying it. The following example together with Figures 5 and 6 may illustrate the tension between abstract and visual knowledge often characterizing architectural assessment – the architect using an organic metaphor basically, albeit not exclusively, concerned with the roof's visual properties, and the reviewer taking this to more abstract levels:

> [ARCHITECT'S COMMENT] This was a great opportunity to further explore my theories relating to the 'parasite' in architecture (…) As a form, [the roof] bites into the thirties structure and clings to the ground inside the

courtyard. Growing from this position, it surges towards the north; splintering the light with glass, shade cloth panels and zincalume-clad wings. These materials combine the flesh-like fragility of cloth with the idea of exoskeleton in the shells and steel. (…) It is analogous to the growth of a large fig tree. Unlike minimalist modernism, it shows the struggle of structure through space.

[REVIEWER'S COMMENT] Richard Goodwin calls his new work a 'parasite'. It's actually a roof which has a strong narrative. To understand this narrative, it is necessary to be aware of his work over the last 20 years: an exploration of the ambiguous space at the conjunction of flesh and skeleton; of the internal as external (…) In this case, this 'parasite' is at work under the building, in the bowels of the structure, emerging to engage the very insides of the building with the unsuspecting passer-by (…) The roof is an organic response to the need for the entire building to mark the passing of time. It creates a dynamic tension. (…) Richard Goodwin, metaphorically, has dumped the guts on the footpath. (…) But what is the point of that? This is the artist confronting us with a truism: this building is not what you see. It has beating, pumping services lying just below its skin. No longer can the neat and poised exterior of the Union Hotel conceal the truth; the underbelly of this building has been scratched and the parasite has emerged. A parasite that exposes the real goings on of this place: of the stench of fifty years of beer and cigarettes, of the tales told, of the jokes had, of the human passing. Scratch below the surface and the spirit of this building will disgorge (James Grose, Architecture Australia, 1999).
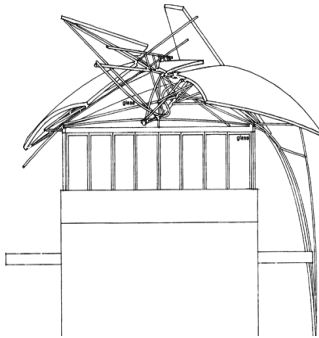
Figures 5 & 6. The Parasite. Courtesy of the architect.

Concluding remarks

As postulated in CMT, metaphor plays a critical heuristic role in understanding new, abstract concepts, in approaching already-known ones from a new perspective, and, of course, in communicating such experiences. One of the concerns of this paper has been to survey metaphor's contribution to furnishing English-speaking architects with a system for thinking, experiencing and discussing built space since this is a prerequisite in order to design ESP materials in an informed way. The second concern has been to describe how this knowledge can be used to teach metaphor in the ESP classroom, from activities more focused on specific skills to those involving the students' participation in some architectural genres (for instance, different types of drawings, crits, or ARs). A genre-metaphor combination is an effective tool for disciplinary enculturation since it shows students when, where and how to use the metaphors that make up the professional jargon and rhetorical devices of the new community of practice – culture – they are about to enter. Finally, since the competences reinforced with the help of the ESP course can always be transferred or re-applied whenever needed, teaching metaphor from a genre perspective can also provide useful insights for the undergraduates' future writing practice, even if this is mostly done in their own language.

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NOTES

[1] This is one of the texts guiding the first-year undergraduates in the School of Architecture of Barcelona ETSAB into the first exercise of the subject "Bases for Architectural Projects" which, in the academic year 2011-12 consisted in decomposing and drawing a fruit or vegetable and explaining the ensuing result ("Acotar I dibuixar una peça de l'hort"). The second text used in the subject is Bruno Munari's "Rose nell'insalata" (1982, pages 4-5, Einaudi).

[2] Unless otherwise indicated, my discussion is based on previous research (Caballero, 2006 & 2013; Caballero & Paradis, 2013) and the examples are taken from these published works.

[3] See, for instance, the degrees offered in the Escuela Técnica Superior de Arquitectura of the Universidad Politécnica de Madrid, ETSAB, Universidad de Toledo, Alicante or Granada, among others.

[4] Images and texts courtesy of the architect. They may be found at http://www.zvihecker.com

[5] See also the pedagogical document "Arch 121. Introduction to Architecture I" offered by the Architecture Department in Çankaya University, Turkey (URL: http://www. arch121.cankaya.edu.tr).

Appendix

Prats, E. & E. Miralles (1991). "Como acotar un croissant". *El Croquis* 49/50: 240-241. Copyright granted by the publication.

COMO ACOTAR UN CROISSANT / *HOW TO LAY OUT A CROISSANT*

El equilibrio horizontal / *Horizontal equilibrium*

Con Eva Prats

A. *Definición:*

Una superficie se envuelve sobre sí misma, y aparece un interior
que se forma al sobreponerse al exterior...

Luego los extremos se cierran sobre sí mismos y forman
la envoltura sobre la que se agrupan los pliegues.

Reconoceremos esta forma en el interior de la bóveda bucal...
(es un misterio parecido al del cuchillo que se rompe al introducirlo
en un vaso de agua)

Al medirlo, las cotas devuelven la transparencia a esta forma, con
todas sus cualidades negativas *: incolora, inodora, y sin sabor.

Y un croissant, la media luna en Argentina, es para ser comido.

B. *Desarrollo del ejercicio de acotar un croissant:*

1.1. Seguir la traza del croissant dejada sobre la fotocopia.

2.2. Rehacer el perfil valorando al máximo las tangentes. Siempre
dándole más importancia —ligeramente— a los segmentos
rectilíneos que a los de circunferencia...

Dejar que aparezca la constelación de centros, sin formar ninguna
relación entre ellos, sólo la regla de las sucesivas tangentes en un
punto.

Damos el perfil de su superficie de apoyo en el horno. Y secciones
transversales que se sitúan:

2.1. A ambos lados del grueso de pasta.

2.2. A mitad del nivel.

Acotar la base:

Tres triángulos respecto a los cuales definimos los puntos
característicos del perímetro. Son triángulos cuyos vértices quedan
situados sobre estos puntos.

Subdividir cada lado del triángulo según los puntos que nos
interesa fijar el perímetro en partes iguales.

La dirección de cada lado del triángulo y su perpendicular actúan
como ejes.

Dar las coordenadas de los centros utilizados para dibujar la silueta.

Por último, mostrar la relación entre los triángulos utilizados.

3. Escala —no tamaño— libre.

* F. Ponge, *Le Gran Recueil.*

A. Definition:

*A surface wraps over itself and an inside appears, formed by
superimposing itself over its outside...*

*Then the ends close over themselves, forming the wrapping over which
the folds are arranged.*

*We recognize this form in the roof of the mouth... (a mystery
comparable to that of the knife which breaks when introduced
into a glass of water)*

*When measuring it, numbers return transparency to the form, with
all its negative qualities:* the lack of color, smell and taste. Because
a croissant, or half moon in Argentina, is meant to be eaten.*

B. Exercise to lay out a croissant, step by step

1.1. Follow the outline of the croissant left on the photocopy.

*1.2. Redo the plan emphasizing the tangents. Always give slightly
more importance to straight segments than to curved...*

*Let the constellations of centerpoints appear without forming any
relation between them, except the ordering of succeeding tangents
at a common point.*

We give the plan of its surface of support in the oven.

And cross-sections located:

2.1. On both sides of the thickest part of the dough.

2.2. A the mid-point.

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