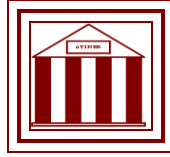


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**ATINER's Conference Paper Series**

**ART2013-0583**

**Re-Presenting Architectural Space in  
Terms of the Literal Existence of Linear  
Perspective: “Perspectiv-Ated Spaces” in  
the Case of Middle East Technical  
University (METU) Faculty of Architecture  
Building**

**Bilge Beril Kapusuz**

**PhD Student**

**Research Assistant**

**Gazi University**

**Turkey**

Athens Institute for Education and Research  
8 Valaoritou Street, Kolonaki, 10671 Athens, Greece  
Tel: + 30 210 3634210 Fax: + 30 210 3634209  
Email: [info@atiner.gr](mailto:info@atiner.gr) URL: [www.atiner.gr](http://www.atiner.gr)  
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**Bilge Beril Kapusuz**  
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**Gazi University**  
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**Abstract**

Linear perspective, which is the discovery of the Renaissance, is momentous in terms of the appearance of a new “way of seeing” that is central to the “subject” and emergence of a “subjective” “way of representing” the world. It is first mediated into the field of architecture by Filippo Brunelleschi and also practiced throughout his architectural productions. Thus, linear perspective as a mode of architectural representation is considered to be both an “instrumental” and “conceptual” tool for the perception and production of architectural space.

Referring back to the naves of the Renaissance cathedrals designed by Brunelleschi, this paper will put remark on the status of perspective projection which renders possible the experience of the spatial effects before they are constructed, in better words “the production of space as an image”. Accordingly, it will promote the spatial concept of “perspectiv-ated space” which addresses a more perspectival effect spatially in the space constructed and visually in the space represented. This concept will reassert spatial issues that reinforce the perspectival effect.

This paper will trigger a reinterpretation for the concept of perspectiv-ated spaces –that has its roots in the Renaissance- and a possible re-reading on the spaces of Modern Architecture regarding METU Faculty of Architecture Building as an exceptional construction for the reconsideration of the concept. It is claimed that the necessary elements of linear perspective; the central vanishing point and the structural grid, “literally” exists in the faculty building which will be represented visually with the images of architecture.

**Keywords:** Architectural Representation, Linear Perspective, Perspectiv-ated Space, METU Faculty of Architecture Building

**Corresponding Author:**

## Introduction

The Renaissance in the fifteenth century is commonly referred as the moment of the “enlightenment of vision” by its discovery of linear perspective and the most significant notion of linear perspective: the vanishing point. Regarding the Renaissance as a “paradigm<sup>1</sup>” perspective is considered as a cultural fragment of the model which alters and “reconstructs” the orders of the visual relations –making the subject central. Thus the representation of the space is also reconstructed both in the field of art, since Renaissance paintings were the first to accommodate the representation of architectural space; and in the field of architecture which generates its own paradigm of architectural representation. (Türer&Yücel, 2005)

It is accorded that the Renaissance architect Brunelleschi is the inventor of perspective in early 1400s in terms of his drawings of the *Battistero di San Giovanni* (Florence Baptistery) with an accurate linear perspective projection. Nevertheless, it was Alberti –with his identity as an artist- who is the first to systematize perspective by introducing his formal apparatus *costruzione legittima* and to establish a treatise, *Della Pittura* (On Painting). However, still it is important to point to the demarcation line between the perspective approach of an artist and an architect; Alberti’s concern as producing a “fictional artwork” versus Brunelleschi’s concern as producing a ‘physical space” out of the “illusionistic space” of his painted panel of the Baptistery.

In this context it is one aim of this study to bring perspective into agenda for its significance as a “mode” of architectural representation (Hewitt, 1985), which accommodates both the production and reproduction of architectural space. On the issue of perspective’s visualization of three dimensional spaces beforehand, in other words the “architecture of images”, from the viewpoint of the viewer, Daniela Bertol (1996) states:

*Thanks to perspective renderings architectural designs could be visualized before their construction. The use of perspective generated capabilities completely different from those made possible by previous forms of architectural representation. It allowed for creation of a two-dimensional visual simulation of an architectural composition. In other words, it made it possible to see from a two-dimensional medium what before could have been perceived only from viewing a physical, three-dimensional object. Architectural artifacts began to be communicated through images; better continuity from the design to the actual construction was established.*

From here on, a contemporary author Lorens Holm becomes an important reference for the reconsideration of perspective, and is referred for the spatial

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<sup>1</sup>“Paradigm” first gained its contemporary meaning from Thomas Kuhn who is an historian of science. Kuhn defines paradigm as such: “In its established usage, a paradigm is an accepted model of pattern.” (Kuhn, 1996)

concepts he introduces. Furthermore he argues that ‘architecture has the potential to produce space as an image’ (Holm, 2010). In this sense, this study acknowledges the argument of Holm that architecture and perspective mirrors each other. In order to discuss the production of architecture in terms of images, Holm refers to the Brunelleschi’s architectural edifices of the Renaissance, which are the cathedrals *San Lorenzo* and *Santo Spirito* in Florence.

Perspective effect raises the concept of “perspectiv-ated architecture” which Holm uses for the interiors of Brunelleschi’s cathedrals and claims that ‘some spaces are more perspectival’ (Holm, 2010). Holm relates this situation to the instrumental status of perspective projection, which is also related with its status of being ‘on the way to the buildings’ (Evans, 1989); that perspective renders possible the experience of the spatial effects before they are constructed. It is Rudolf Wittkower to whom Holm refers for his analysis of the spatial notions of Renaissance space and his emphasis on the spatial “homogeneity” that makes it a “homogeneous space”. Homogeneity remains as an essential feature to describe the Renaissance’s rationalized perspectival space and is claimed to be evident in the gathering of architectural elements in order to maintain a metrical order in the orthographic projection of architectural space (in plans and elevations), and also to make visible the continuum of the ratios and proportions in the perspectival projection (Wittkower, 1953).

It is another aim of this paper to promote the concept of “perspectiv-ated space” –derived from Holm’s “perspectiv-ated architecture”- and reconsider the act of perspective in a contemporary architectural edifice by the representation of its interior spaces namely Middle East Technical University (METU) Faculty of Architecture Building.<sup>1</sup> It is claimed that there are significant perspectiv-ated spaces which renders the perspective construction literally visible from certain subject positions in the faculty building. The spatial notions inherent in the perspectiv-ated spaces of the Renaissance such as “repeating structural orders,” “proportional diminishment,” “rhythm and illusion of depth,” “symmetrical architectural composition” and the “grid” will construct the framework for the reconsideration of spatial effect of perspective while analyzing the spaces introduced by the case. This study makes a deduction by approaching to the photographic images of three-dimensionally constructed real space of the faculty interiors to reach the two-dimensionally constructed illusionistic space, in other words the perspective projection of the architect.

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<sup>1</sup>The faculty building has been the architectural case of the author’s completed master thesis entitled “Perspective For The Reproduction of Architectural Space: ARCH524 As a Pretext”, supervised by Prof.Dr. Ayşen Savaş in METU Dept. of Architecture, 2012.

## **Linear Perspective and Representation of Architectural Space in the Renaissance**

The era of the Early Renaissance both constructed and witnessed the “enlightenment of vision,” and made central the human-eye, thus elevating the subject. With this subject-centered approach, the entire understanding of the concept and techniques of representation were altered irrevocably, which also changed the perception and representation of space.

The historical conditions that created the interrelationship between architecture and images have been discussed onwards as means of the discourse on architectural representation in terms of ‘a three-dimensional world and its representation’.

*The three-dimensional space of our experience is perceived as a projection on the two-dimensional surface of our retina. The stereoscopic effect, which causes the perception of depth, is given by our binocular vision. Of the three physical dimensions of space – width, height and depth – depth is the most “subjective” because it is related [more] to the way our visual perception works than to the physical reality of the objects of our perception (Bertol, 1996).*

The emphasis of subjectivity on the spatial dimension “depth”, in relation to perspective, accounts the difference between the two-dimensional visual perception of spatial semblance and the measurable three-dimensional space. In other words ‘perceptual space can be different from physical space’, the space represented as well. This difference is explained by the fact that the size of an object decreases with as its distance from the observer increases, rectangles are perceived as trapezoids, angles change amplitude, parallel lines meet at a single point (the vanishing point) and parallel horizontal planes meet on a line known as the horizon. (Bertol, 1996) Therefore, by using linear perspective projection the architect create consciously a two-dimensional space and a spatial perspective effect different than the physical space. Due to the architect’s dictation of the viewpoint, the created spatial effect is only accessible visually through the two-dimensional perspective projection of the architect or by the physical existence of the viewing subject on the subject position in the three-dimensional space offered by the architect.

There is consensus that Brunelleschi was the first to practice perspective as an “intellectual” tool, that is to say as a tool of architectural conceptualization and freed perspective from being a mere mimetic tool that was only concerned with affirming nature through artistic concerns. With Brunelleschi’s contributions as an architect, perspective became instrumental, as he reconsidered that “images of architecture” could be mediated into the “architecture of images,” which for Damisch (1994) means the construction of architecture. As mentioned above, “Brunelleschi’s architecture aspired to make clear this one-to-one correspondence between space represented and space perceived,” (Holm, 2010) since Rudolf Wittkower (1953) says Brunelleschi’s



*San Lorenzo* and *Santo Spirito* were designed using linear perspective projection. It is assumed that both of them were already constructed as an image before they were constructed physically. Holm states that '[i]f perspective is a two-dimensional representation of a three dimensional space, then architecture becomes the three-dimensional representation of a two-dimensional space, perspective and architecture mirroring each other.' (Holm, 2010)

### **Architectural Space as an Image: “Perspectiv-ated Architecture” of the Renaissance**

The architecture of the image or the architecture of perspective – in other words, a three-dimensional representation of a two dimensional representation – requires the introduction of the concept of “perspectiv-ated architecture,” which is claim to be designed for “subject positions” (Holm, 2010). It would be adequate to mention Wittkower for his definition of the concept “homogeneity” and “homogenous space” that would all together contribute to the definition of “perspectiv-ated space.”

Homogeneity remains as an essential feature to describe the Renaissance’s perspectival space. Homogeneity is claimed to be evident in the gathering of architectural elements in order to maintain a metrical order in the orthographic projection of architectural space (in plans and elevations), and also to make visible the continuum of the ratios and proportions in perspectival projection. The nave of *San Lorenzo* supports his argument of “the equal validness of proportion in perspective.” With regards to the subject’s movement in the nave, with each step the subject creates a new “cone” of vision and constitutes new sections with every time the subject chooses to stop moving. Wittkower (1953) claims that at each section, a perspectival view is constructed with the same proportions.

It is argued that some spaces are more perspectival than the others (Holm, 2010). By referring to the naves of *San Lorenzo* and *Santo Spirito*, it is stated that ‘the nave looks like a perspective drawing materialized in three dimensions’. To make the manifestation clear, it would be necessary to quote to Holm and his questioning:

*Why are some spaces more perspectival than others? Why are not all spaces equally perspectival? And why does the nave look perspectival to the viewer even when he/she is not standing on the axis? Why do some spaces look like they are in perspective from anywhere?* (Holm, 2010)

This effect is claimed to be only accessible through the perspective image that produces architectural space. And it is this effect that makes the space “perspectiv-ated”.

In an attempt to define the concept of “perspectiv-ated space,” it is necessary to note that “the perspective effect of ‘proportional diminution’ of ‘repeating elements’ are a function of the picture plane.” Even though the homogeneous space of the Renaissance maintains a systematical and isotonic order in plan and section, the effects of “depth,” “rhythm” and “illusion” come with the perspective image created by the architect and perceived by the viewer. Wittkower (1953) declares that his main concern is to cover “proportion” by handling the very notions of Renaissance interior space in tandem with linear perspective and defines Renaissance space, which has been rationalized by perspective, as “an optical space of measurable quantities” and denotes that by means of perspective the ‘distances of objects seen by an observer can be rendered mathematically correctly in the two dimensions of a picture’. In this context, Renaissance architects were in pursuit of “subjective impressions” of architecture in virtue of “objective proportions.” Wittkower’s writing below could be read in favor of understanding perspectiv-ated space:

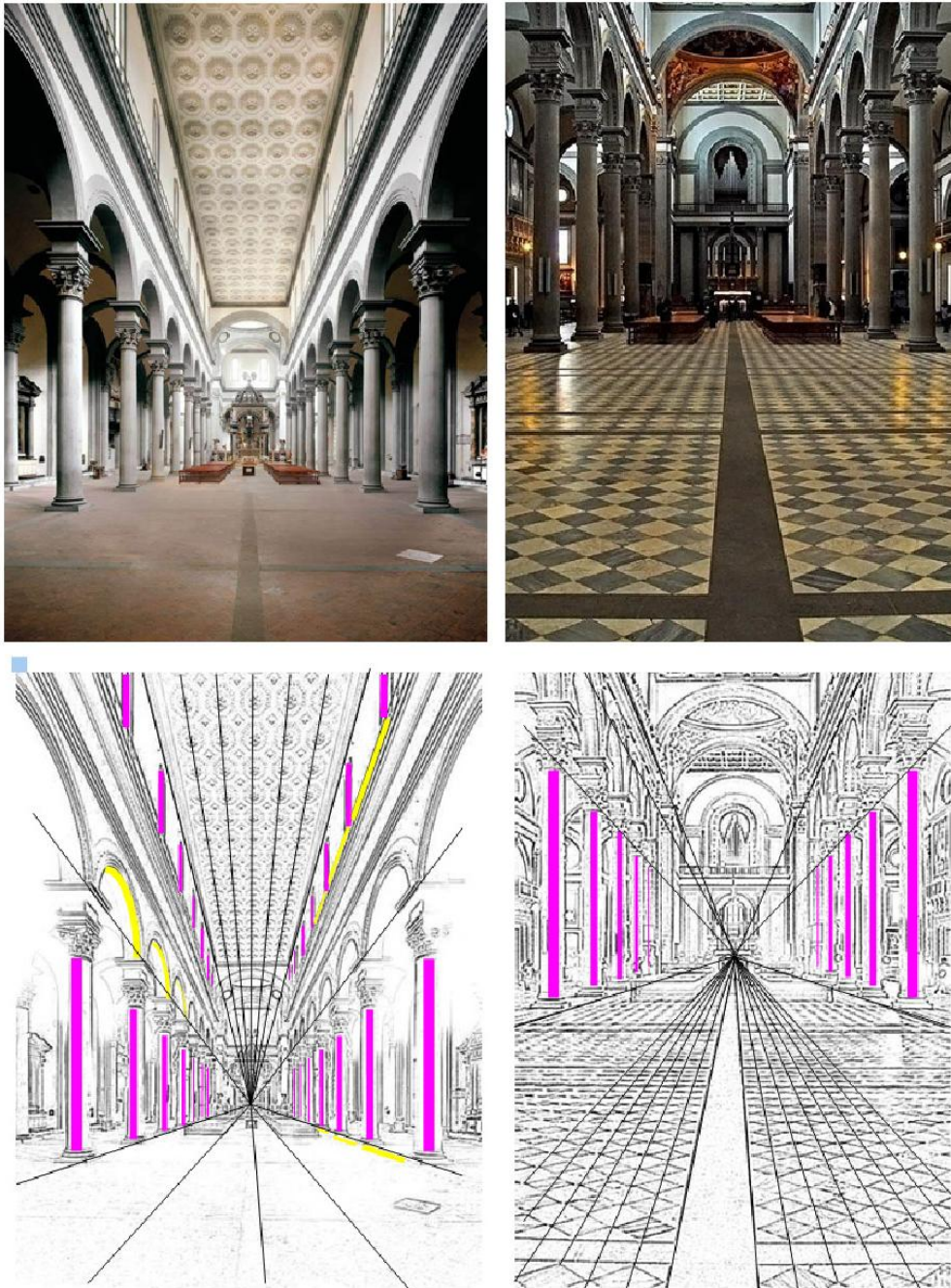
*We all know that the way we see visual images depends on the notions in which we believe. Brunelleschi's invention of linear perspective set the seal to the Renaissance conviction that the observing eye perceives metrical order and harmony throughout space. If one is keyed up to the metrical discipline of buildings like San Lorenzo or Santo Spirito and tries to see as if through a screen the lines retreating towards the vanishing point and the quickening rhythm of the transversals, it is possible to evoke visual reactions similar to those which Renaissance people must have experienced. (Wittkower, 1953)*

To illustrate the clues of homogeneity, proportion, and scale; perspectiv-ated spaces of Brunelleschi’s *San Lorenzo* and *Santo Spirito* could be regarded as the embodiment of the introduced concepts. The diagrams highlight the architectural notions that constitute perspectiv-ated space. (Fig.1)

### **Results & Discussion: “Perspectiv-ated Spaces” in the Contemporary Context; Case Study METU Faculty of Architecture Building**

Middle East Technical University’s Faculty of Architecture building was designed by seminal Turkish architects Behruz Çinici and Altuğ Çinici, and was completed in 1963. The faculty is considered a seminal example of modern architecture, much influenced by the architectural movement Brutalism. The motifs of Brutalism are seen in the repetitive geometries in the components of the building, the constructive details and the materials left bare. Indeed, the faculty building was constructed largely of concrete and glass.

**Figure 1.** Florentine cathedrals Santo Spirito and San Lorenzo, by Filippo Brunelleschi ([http://wga.hu/html\\_m/b/brunelle/index.html](http://wga.hu/html_m/b/brunelle/index.html)) / Reproductions of perspectiv-ated architecture (illustrations produced by the author)



If the faculty's architecture is analyzed assuming it is an autonomous entity regardless of its association with the architectural circumstances of its own historical period – it is possible to find correspondences with a conception of space of another historical context, i.e., of the Renaissance's perspectiv-ated spaces. This spatial concept reasserts spatial issues that have been previously covered by re-examining Brunelleschi's cathedral interiors: significantly the

checkerboard pattern, which is “the grid” of the Renaissance, the repeating columns defining the central nave, the arches that join the columns and the windows. It is also important to note once again that “perspectiv-ated” space dictates that the vanishing point is substantial for the perspectival perception of architectural space, which is sought in the interiors of the faculty building in the following section of this chapter. At this point, it is relevant to give place to the rhetoric on the faculty building by referring to Prof.Dr. Ayşen Savaş and her commentaries:

*METU Faculty of Architecture building is an exceptional construction for the comprehension of the term “perspectiv-ated space”. The depiction of the space involves the construction of a “convincing illusion of space” on the two-dimensional flat surface of the canvas; it requires the unification of all the architectural elements such as columns, balustrades, stairs, within a single spatial system. It is indeed a linear recession of objects in the “illusionistic space.” The necessary elements of linear perspective; the central vanishing point and the structural grid, which determines the location and the dimensions of the architectural elements within the illusionistic space, literally exists in the faculty building.<sup>1</sup>*

It is one of the findings of this study is that linear perspective literally exists in the interior spaces of the faculty. So to say, it is possible to find spatial correspondences in the faculty spaces with the constituents of linear perspective projection.

As the first constituent, the projection lines could be pointed. It is claimed that the metrical and rational orders of the structure such as repeating columns, beams arranged in equal intervals; and other constructive elements of the faculty building, namely the lighting elements, glazing and balustrades reinforces the concepts of repetition, proportion, rhythm and depth and put remark on the “linearity” in favor of the perspectival effect within the perspective perception of the faculty space.

Secondly, the grid is another constituent of the projection. In this sense, the study refers to the “grid” of Alberti’s *costruzione legittima* (legitimate construction). Acknowledging the perspective constructions in Renaissance paintings in an artistic context and the “checkerboard pattern” of the floor tiles in Renaissance spaces in architectural terms, the grid is the representative of the rational systematized space which aims a vanishing-axis procedure schematization (Panofsky, 1991). The checkerboard pattern in the Renaissance’s pictorial and constructed space is an essential feature that defines the limits of the space and supports the illusory depth effect of perspective.<sup>2</sup> The coordinates defined spatial relationships relative to the distances between the points of the Cartesian system. As another finding from

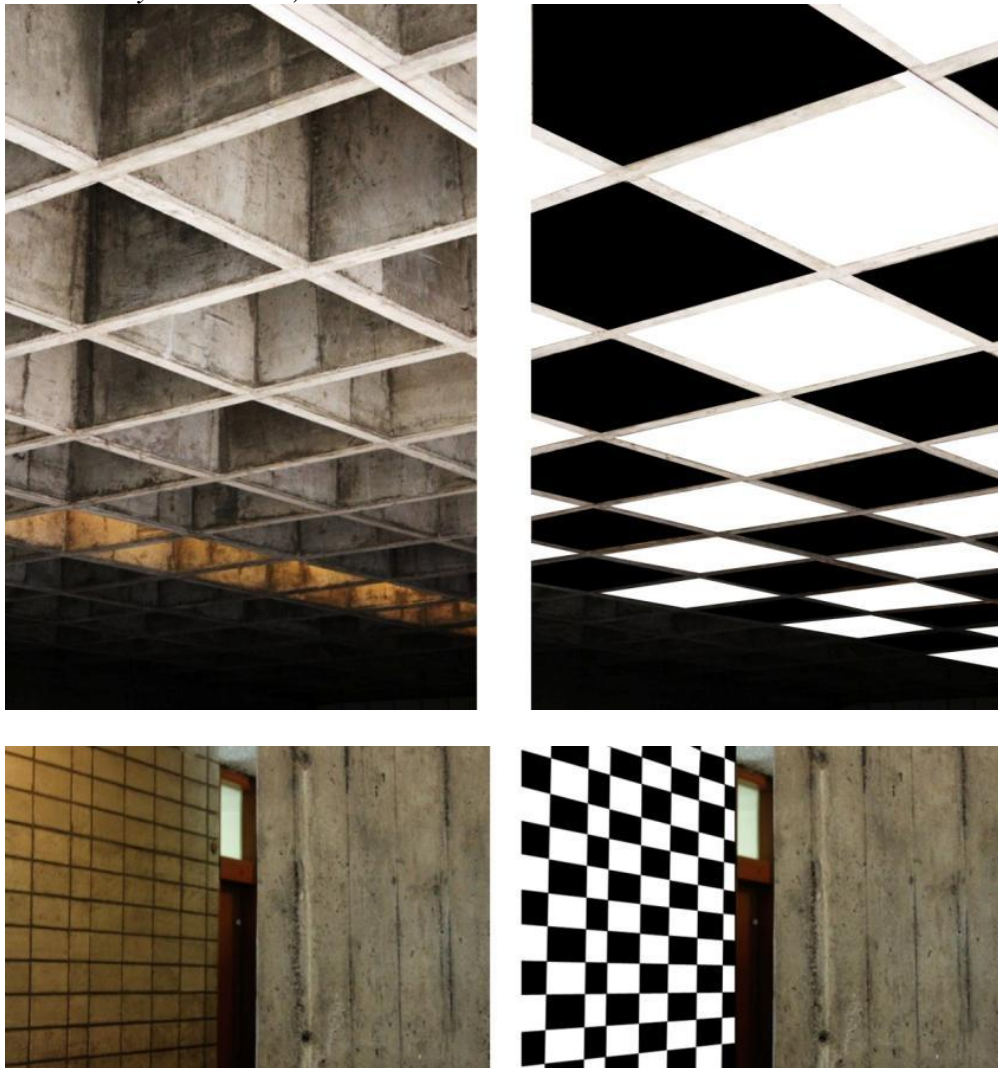
<sup>1</sup>Interview with Prof.Dr. Ayşen Savaş, METU, Ankara, July 2012.

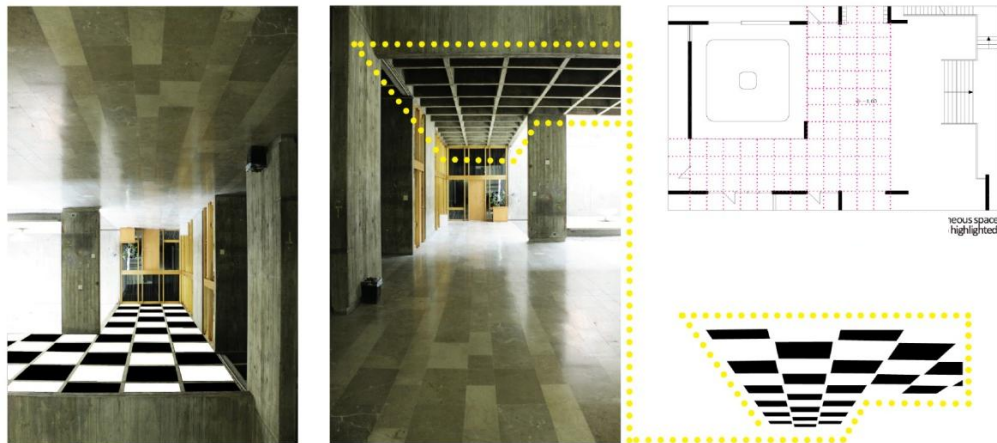
<sup>2</sup>The checkerboard pattern is basically an abstract grid that has appeared throughout the history of art and architecture in various guises



the faculty building, grid (as in the floor of Renaissance space) is found in faculty's ceilings in the form of concrete waffle slab that is constituted by the repetition of square units, and the walls of concrete brick units. (Fig.2) Considering the modes of architectural representation of the faculty building – namely the plans and sections – the grid is not represented and is invisible. On the contrary, perspective drawing and the image of the perspective view render the grid visible. Thus, the subject position and the viewpoint are essential for the perception and representation of the perspectiv-ated space.

**Figure 2.** *'The Grid' of Linear Perspective Projection existing in the METU Faculty of Architecture Building (Photographs taken and illustrations produced by the author)*



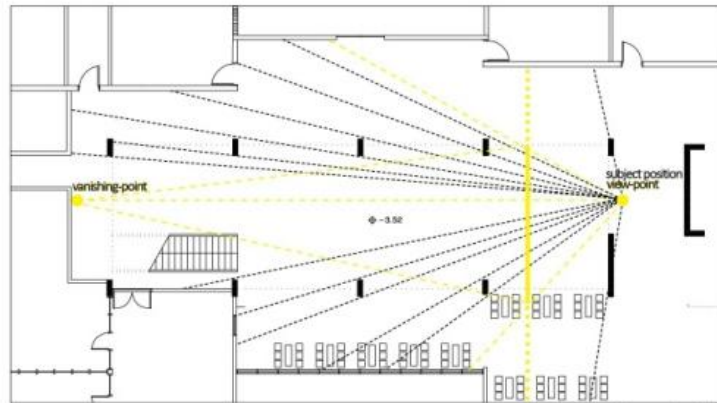
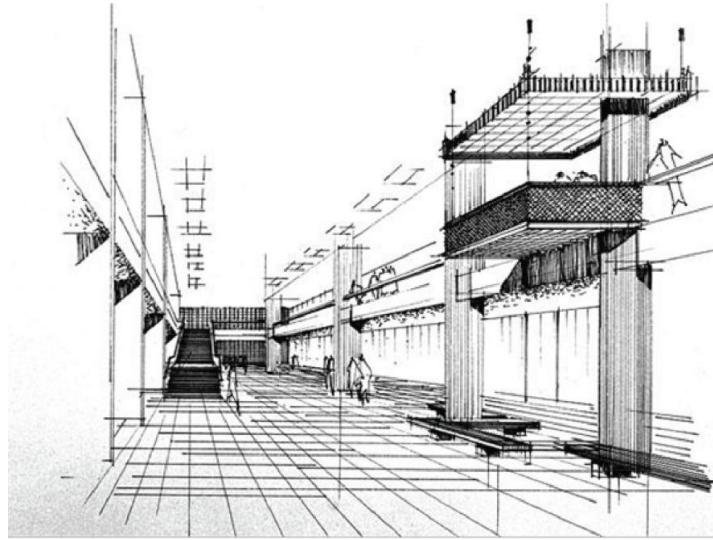


Accordingly, the last element of the projection, the vanishing point is highlighted. The third correspondence pointed is that certain interior spaces diminish towards heightened vanishing points, which are claimed to be created by the architect beforehand by the perspective projection. Thus, this study suggests that there exist visually significant subject positions and reciprocal vanishing points in the interiors of the faculty.

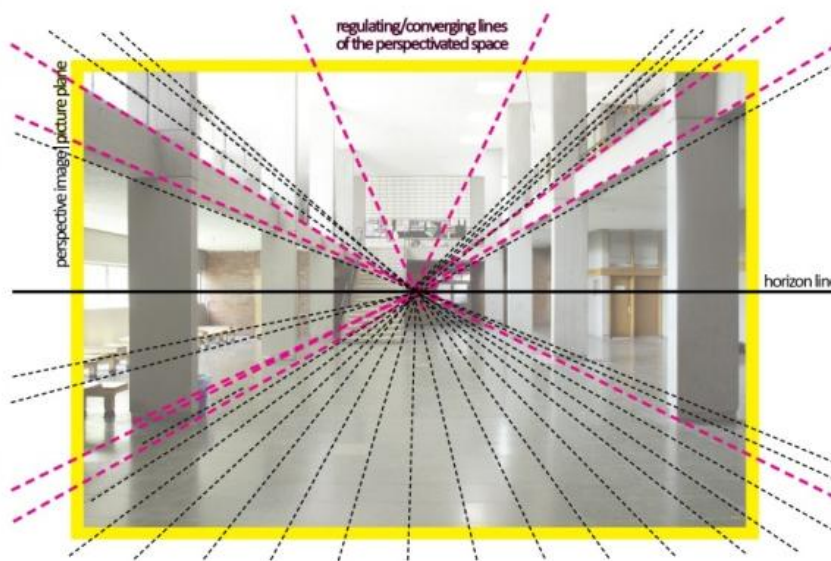
With the acknowledgement and suggestion of the inherent “perspectiv-ated spaces” in the faculty building, this study aims to achieve the precise vanishing points in the faculty and reveal several of them by capturing photographic images –as the representations of architects’ perspective projections of the space. The method of visual analysis includes the reproduction of the perspective image of the suggested architectural space by schematically highlighting the notions that visually represents the perspectival construction. The subject positions and depth are also represented on the partial plans of the faculty’s interior spaces, together with the representation of the picture plane that intersects the subject’s cone of vision and is limited by the frame of the photographic perspective image. The diagram constitutes the perspective image and relocates the vanishing point by transferring the converging lines of the perspective construction of the perspectiv-ated space onto the photograph. (Fig.3)

To conclude, it should be noted that perspective as a mode of architectural representation and once as a model of the Renaissance paradigm, still remains significant for the (re)production of architectural space in the contemporary paradigm and has the potential to generate discussions with the reinterpretation of the architectural spaces of modern architecture. In accordance with this statement, this study de-contextualizes and relocates both the “Renaissances eye” of the architect, and linear perspective in a contemporary architectural situation by re-contextualizing perspectiv-ated spaces of Renaissance and representing interior spaces of the faculty –within an edifice of modern architecture- visually, in terms of literal existence of linear perspective.

**Figure 3.** *Re-presenting the perspectiv-ated space in METU Faculty of Architecture Building (perspective drawing by Behruz Çinici, diagrams produced by the author)*



plan | perspective construction  
designated subject position of the perspectivated space



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