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Factors influencing function and form decisions of interior architectural design studio students

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Abstract

The design studio constitutes the core of interior architecture education. The purpose of this research is to discuss the factors influencing function and form decisions of students in design studio where the students encounter various obstacles in solution-seeking process for the design problem. The study primarily defines the educational approach of design studio and examines deductive and inductive design methods which guide students in their function and form decisions. The function and form decisions of students within two design studio case studies and a survey administered to these students are analyzed in order to discuss the factors influencing their decisions.

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Keywords: Design studio; Interior architecture education; Decision making; Design process; Design methodology

1. Introduction

Interior architecture education is a studio-oriented type of training in which students become acquainted to and become skillful at solving technical, social, cultural and technological aspects of the problems of interior architectural design. Yet, the act of design is the problem of suggesting ideas on analysis, synthesis, evaluation and solution. Afacan (2012) points that each studio project consists of stages such as studying of previous examples, spatial analysis, form research, material selection and construction techniques decision, and preparation of presentation drawings and three-dimensional models. Interaction between the project coordinator and other project students in the studio provides a practice for real-life situations. As Uluoğlu (2000) suggests, the conscious facilitation of an experiment in design education prevents professional practices from being coincidentally taken

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place in the future. In this sense, the design studio is a substantially complex and formidable experience. In this demanding experience, students are expected to perform two tasks simultaneously: to design and learning to design. Sachs (1999) points that certain students meet expectations without facing any problems but a majority of the rest encounter a "stuckness" that may even result in cessation of the project in the decision stage. This "stuckness" occurs in the design stage, the most difficult stage of the project, where main decisions of the project are taken. Upon examination of the process of project development experienced in the interior architectural design studio, it has been observed that this process consists of three phases; namely, research-programming, design and presentation. Students choose their design methods in the "design" stage where they have got the most difficulty in reaching a solution, and have to make the main decisions about the project. These design methods offer a road map to the students and main decisions taken on the project are brought to maturity through dialogue with the project coordinator (Kvan &Yunyan, 2005). These decisions are about the principles of "utilitas, venustas, firmitas", which are referred today as function, form and construction, suggested by the architectural theoretician Vitrivius (2005). The function and form decisions within these resolutions constitute the first and most important steps of the design stage. In this context, while the first part of the research defines the design studio training in the general sense, the second part studies the "deductive" and "inductive" design methods which can be practiced in the interior architectural design studio and can guide students in making decisions on function and form. The third part analyzes function and form decisions of students through a case study in two interior architectural design studios where the said design methods are practiced upon and it discusses the outcomes of a survey administered to these students in order to determine the factors which influence their decisions.

2. Interior architectural design studio

In most disciplines, classes in universities are the common environment for learning and teaching. Instructors teach by lecturing and assigning homework, and evaluate performance by exams. In design studio, contrary to these theoretical classes, students are expected to offer fitting solutions to hypothetical design problems assigned by the instructor and they learn by working on projects (Oh et al., 2012). Students develop their projects in design studio in parallel to criteria provided by the instructor and jury (Schön, 1985). As some theoreticians suggest, education in design studio is provided by jury's critiques offered by multiple instructors while desk critique is offered by a single instructor and group critique (Dutton, 1987; Schön, 1984; Attoe & Mugerauer, 1991). While desk critique is considered as the main component of studio education and while it is the individual critique session executed by the student on their desk, group critique is that a small group of 5-10 students, gatherings together, comment on each others' project. Roles of instructor and student can differentiate in these critiques. As Ciravoğlu (2003) indicates, instructor is the "master" and student is the "apprentice" in some studios. The instructor (master) passes their professional knowledge and experience to the student (apprentice) through critiques in the master-apprentice training. Another role undertaken by the instructor and student in the design studio is the "user-designer" role as claimed by Dutton (1991). In this design studio, the instructor (user) comments on the student's (designer) project according to user perspective and orients project by user demands. Regardless of the aforementioned critique methods, instructors in design studio provide students with a design method that will guide them through developing solutions particularly for their initial projects. In that context, the latter part of the research examines the "deductive" and "inductive" methods which are among the methods that can act as a guide for interior architecture students in the freshman year.

3. A guiding method in design studio: deductive and inductive methods

The design problem consists of factors based on data consisting of various numbers and qualities based on an informational background. This problem is based on the same background with epistemology which is commonly analyzed in the discipline of philosophy. In this sense, Özer (1975) examines the design problem within philosophy and has developed a design methodology within this framework. According to this methodology; the deductio (deductive) and inductio (inductive) methods which have emerged as two different schools of thought in the philosophy discipline can be applied as reaching a singular solution through universal data (architectural shell) and a universal solution through singular data (functions). Özer (1975) divides the inductive method in architectural design process into three subcategories which are the methods of "induction through grouped primal functions", "induction through primal functions" and "induction through partially primal functions".

3.1. Deductive method in architectural design

Deduction is a method in philosophy which offers a way of theoretical thinking that begins in the general and ends in the particular and it narrows down from universal to singular (Manktelow, 2000). Similarly, in architectural design it is defined as the method of reaching singular forms of primal functions from a general form which

constitutes the universal solution of the design problem. The main principle in this method is that universal form does not get affected from changes in primal function or partially primal function. One, several or all of the economic, technological, functional and aesthetic reasons may lead the designer to decide on the rational or irrational forms of the deductive method for the purpose of finding a solution to a specific architectural matter. Rational deduction stands to be a commonly adopted method with respect to factors such as constructional application and economic efficiency. The most vital inconvenience that deduction method poses is that it does not give primal functions (the liberty of finding their own original forms) and therefore the method of deduction creates an external form of hegemony within itself.

3.2. Inductive method in architectural design

Similar to philosophy, purpose of the inductive method is to take the singular as a starting point and widen up to arrive at the whole. It is defined as the method of reaching a general form which constitutes the universal solution from singular forms of primal functions. There are inductive methods for grouped primal, primal, and partially primal functions. In other words, it aims to a universal form through ways of adding, assembling and articulating by taking the singular forms of singular functions as a starting point.

3.2.1. Induction through grouped primal functions in architectural design

Primal functions in architecture are seen to be combined in certain groups (Living+kitchen can be seen as one group form and sleeping+bathroom as one group form in the house example). The design problem is solved by reaching a universal form through group forms which incorporate group functions. One, several or all of the economic, technological, functional and aesthetic factors may encourage this grouping attempt. By this way, there emerges an induction movement gaining momentum out of the groups. Forms that incorporate functions of groups are separated into components of primal functions within the framework of the deduction method. In this context, the induction through grouped primal functions constitutes a medium method between pure deduction in reality and pure induction. The beneficial features of both absolute methods usually face an attempt to be made to fit into an interim solution. Forms of the grouped primal functions may be rational or they may be irrational as well.

3.2.2. Induction through primal functions in architectural design

This method is the definition of pure induction. The universal solution for design problem is achieved by using singular forms of separate functions (A solution can be developed by form groups in the house example which incorporate primal functions such as living environment, kitchen environment, sleeping environment and bathroom environment). Each function in the method of induction through primal functions is developed as needed either in surface or in formation. The primal function is occasionally fit into a sole form (rational or irrational); or sometimes it is interpreted by being separated into its various components.

3.2.3. Induction through partially primal functions in architectural design

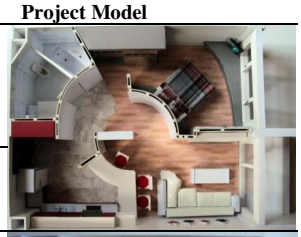
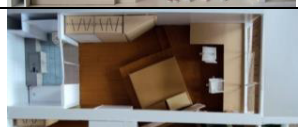
This is an advanced version of the inductive method through primal functions in which a universal form solution is acquired by use of singular forms of partially primal functions which are created by dividing primal functions into subcomponents. The singular volume which contains the primal functions here is obtained via inducting rational or irrational portions which reflect the partial functions (Dividing the living environment primal function into subcomponents of living, eating, working, storing and reaching a universal form through singular forms which incorporate all these partially primal functions by also dividing other primal functions into subcomponents). The distinctive feature of this design method in the designing sense is that each component of a function acquires a new formal identity with itself and none of the partially primal functions recess under the domination of one another. At the same time, the most important disadvantage of the induction through partially primal functions method is extremely complex, dynamic and intricate singular forms which can set various obstacles to designers in terms of application (Özer, 1975). Each functional data which defines the design process influences the creation of architectural form. The forms obtained through design and the creation of the architectural environment are originated by the designer's experience and decisions which have been developed in parallel to bunches of data defining the design problem. Hence, the designer must consider function as well as form in order to create the final product. The designer initially imagines the design data in the beginning stage; then visualizes the images by using two or three-dimensional basic geometrical forms and therefore retrieves the final product in the last stage by altering these images (Özen Yavuz & Akçay, 2012). The design methods mentioned above are also influential in making form decisions by offering a road map to students in their function decisions in interior architectural design process. As Özer (2009) suggests, there is a "reaching a formal order" concept in the essence of architecture design, it affects the aforementioned methods with variations of rationality-irrationality, and it also influences the

determination of solution in the schematic sense with options like right orthogonality, non-orthogonality and curvilinearity.

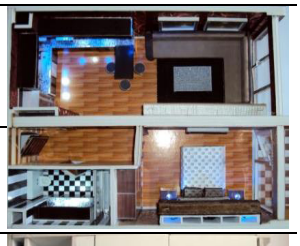
4. Case study: interior architectural design studio

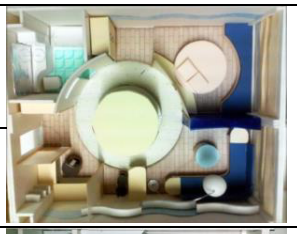
The case study includes design studios of Interior Architecture Department of two different universities, where the said design methods are practiced upon. These second semester design studios include the interior organization and design of a 60m^2 studio flat according to user identities and requirements separately specified for each student. The design studio usually includes desk critiques, additionally there are also 2 group critiques during the term. The studio adopts a "user-designer" studio concept; the instructor (user) passes their project critiques to the student (designer) through user needs and demands. During the first stage in the design studio (the research-program phase), the user identity and needs are determined; individual-measure-behavior research and sample interior solutions are examined and a program is established. The second stage is design phase. Function schemes are created in the planimetric order, conceptual researches are conducted and studies are carried out regarding graphic impact on vertical surfaces in accordance with the concept. In this phase, interior architecture students are expected to solve the studio flat functions with one of the grouped primal, primal or partially primal functions of induction method without modifying the building envelope and execute the design with one of the rational, irrational non-orthogonal or irrational curvilinear forms. Function, color, form, material and construction decisions are made with help of the sketch drawings and models at the end of the design stage. The last one is the stage of project presentation. It includes presentation of the project by traditional methods or by digital media and by creating a model. The research analyzes function and form decisions of 24 students (12 students for each studio) who have submitted their projects and discusses the influencing factors of these decisions. Table 1 examines under the title of "function" each students' project's user identity, program, design method and factors influencing the function decision-making process and examines under the title of "form" each students' project's form decisions in planimetric order and factors influencing the form decision-making process.

Table 1. Function and form decisions taken by students in design studio and factors that influence these decisions

Function	Form	Project Model
User identity: Advertiser **Program:** Sleeping, living, eating, kitchen and bathroom environment **Design method:** Induction through primal functions	**Form decisions on the planimetric order:** Irrational curvilinear	
Factors influencing the decision-making process: Ease of use	**Factors influencing the decision-making process:** Unique form creation	
User identity: Architect **Program:** Sleeping, living, working, eating, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational non-orthogonal	
Factors influencing the decision-making process: Spatial personalization	**Factors influencing the decision-making process:** Designer identity	
User identity: Engineer **Program:** Sleeping, clothing, living, eating, kitchen and bathroom environment **Design method:** Induction through grouped primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Traditionality	**Factors influencing the decision-making process:** Applicability	
User identity: Photographer **Program:** Sleeping, living, eating, dark room, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational non-orthogonal	

Factors influencing the decision-making process: User identity	**Factors influencing the decision-making process:** Unique form creation	
User identity: Jewelery designer **Program:** Sleeping, living, eating, kitchen and bathroom environment **Design method:** Induction through primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Ease of solution	**Factors influencing the decision-making process:** Applicability	
User identity: Student **Program:** Sleeping, living, working, eating, kitchen and bathroom environment **Design method:** Induction through primal functions	**Form decisions on the planimetric order:** Irrational non-orthogonal	
Factors influencing the decision-making process: Ease of use	**Factors influencing the decision-making process:** User identity	
User identity: Model **Program:** Sleeping, clothing, living, eating, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational non-orthogonal	
Factors influencing the decision-making process: Spatial personalization	**Factors influencing the decision-making process:** Unique form creation	
User identity: Designer **Program:** Sleeping, clothing, living, eating, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational curvilinear	
Factors influencing the decision-making process: User identity	**Factors influencing the decision-making process:** Designer identity	
User identity: Sea captain **Program:** Sleeping, living, eating, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational curvilinear	
Factors influencing the decision-making process: Spatial personalization	**Factors influencing the decision-making process:** User identity	
User identity: Ceramicist **Program:** Sleeping, living, eating, kitchen and bathroom environment **Design method:** Induction through grouped primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Ease of use	**Factors influencing the decision-making process:** Ease of solution	
User identity: Cook **Program:** Sleeping, living, eating, kitchen and bathroom environment **Design method:** Induction through grouped primal functions	**Form decisions on the planimetric order:** Rational	

Factors influencing the decision-making process: Applicability	**Factors influencing the decision-making process:** Applicability	
User identity: Author **Program:** Sleeping, living, library, eating, kitchen and bathroom environment **Design method:** Induction through primal functions	**Form decisions on the planimetric order:** Irrational curvilinear	
Factors influencing the decision-making process: Ease of solution	**Factors influencing the decision-making process:** Unique form creation	
User identity: Banker **Program:** Sleeping, clothing, living, working, eating, kitchen and bathroom environment **Design method:** Induction through primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Traditionality	**Factors influencing the decision-making process:** Applicability	
User identity: Graphic artist **Program:** Sleeping, living, eating, working, kitchen and bathroom environment **Design method:** Induction through grouped primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Ease of solution	**Factors influencing the decision-making process:** Applicability	
User identity: Singer **Program:** Sleeping, living, eating, kitchen and bathroom environment **Design method:** Induction through grouped primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Ease of solution	**Factors influencing the decision-making process:** Applicability	
User identity: Lawyer **Program:** Sleeping, living, working, eating, kitchen and bathroom environment **Design method:** Induction through grouped primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Ease of solution	**Factors influencing the decision-making process:** Applicability	
User identity: Landscape architect Program: Sleeping, clothing, living, working, greenhouse, eating, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Spatial personalization	**Factors influencing the decision-making process:** Applicability	
User identity: Student **Program:** Sleeping, living, working, eating, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational curvilinear	

Factors influencing the decision-making process: Spatial personalization	**Factors influencing the decision-making process:** Unique form creation	
User identity: Director **Program:** Sleeping, living, eating, kitchen and bathroom environment **Design method:** Induction through grouped primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Ease of solution	**Factors influencing the decision-making process:** Ease of solution	
User identity: Model **Program:** Sleeping, living, working, eating, kitchen and bathroom environment **Design method:** Induction through primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Applicability	**Factors influencing the decision-making process:** Traditionality	
User identity: Photographer **Program:** Sleeping, living, eating, dark room, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational non-orthogonal	
Factors influencing the decision-making process: Spatial personalization	**Factors influencing the decision-making process:** Unique form creation	
User identity: Sea captain **Program:** Sleeping, living, working, eating, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational curvilinear	
Factors influencing the decision-making process: Spatial personalization	**Factors influencing the decision-making process:** User identity	
User identity: Model **Program:** Sleeping, living, clothing, runway, eating, kitchen and bathroom environment **Design method:** Induction through partially primal functions	**Form decisions on the planimetric order:** Irrational non-orthogonal	
Factors influencing the decision-making process: Designer identity	**Factors influencing the decision-making process:** Designer identity	
User identity: Painter **Program:** Sleeping, living, art studio, eating, kitchen and bathroom environment **Design method:** Induction through grouped primal functions	**Form decisions on the planimetric order:** Rational	
Factors influencing the decision-making process: Traditionality	**Factors influencing the decision-making process:** Applicability	

4.1. Function and form decisions of students in interior architectural design studio

Upon examination of studio flat projects (table 1) of 24 students of two design studios, it has been found out that 8 students have chosen induction through grouped primal functions, 6 students have chosen induction through primal functions, and 10 students have chosen induction through partially primal functions method under the function title. Percentages of the decisions have been examined in fig. 1(a). Under the form title, it has been seen that 12 students

have chosen rational, 6 students have chosen irrational non-orthogonal, and 6 students have chosen irrational curvilinear forms. Percentages regarding the form decisions have been examined in fig. 1(b).

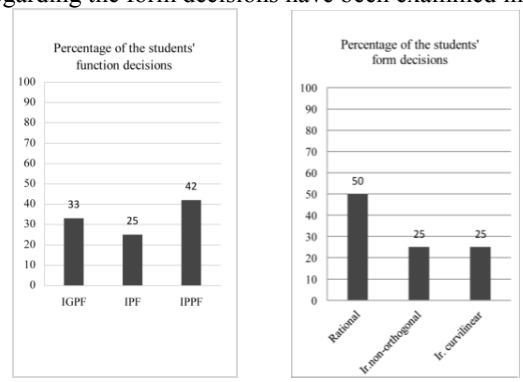


Figure 1. (a) Function decisions of the students; (b) Form decisions of the students.

4.2. Factors influencing form and function decisions of students in interior architectural design studio

Kumkale (2008) suggests that the design process can be compared to a "black box" executed with intuition and personal accumulation of knowledge developed by the individual's own experience. The most compelling stage in the interior design studio is the one in which students develop function and form decisions. There are certain influencing factors in the design stage that lead the students in their function and form decisions during their time of stuckness-uncertainty. A survey has been administered on students in order to determine these factors after the submission of projects. The survey has asked students to define what influences them mostly in the process of making function and form decisions and asked to choose one of the answers among the options of "ease of solution", "traditionality", "ease of use", "spatial personalization", "user identity", "applicability", "designer identity" and "unique form creation". As a result; percentage of factors that influenced students who made designs with induction through grouped primal functions, induction through primal functions and induction through partially primal functions are shown on fig. 2(a) , 2(b), and 2(c); and percentage of factors that influenced students who applied rational, irrational non-orthogonal or irrational curvilinear form decisions on their projects are shown on fig. 2(d), 2(e) and 2(f).

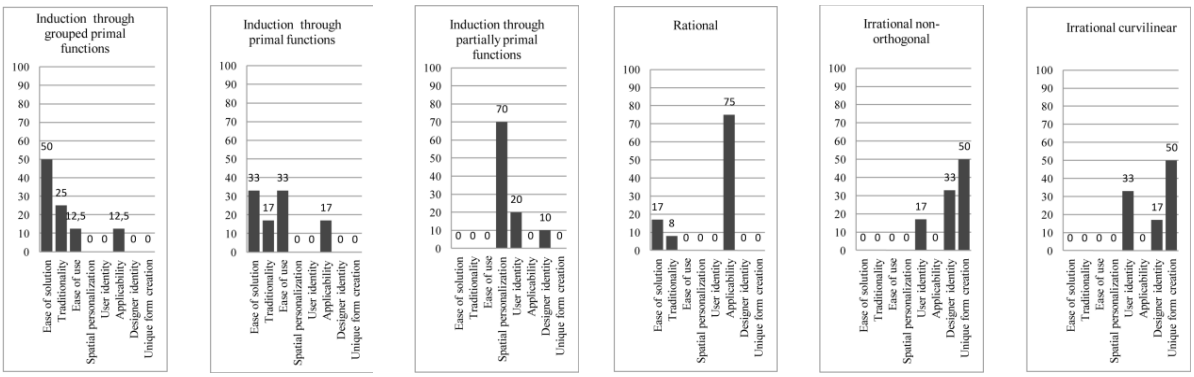


Figure 2. Factors influencing students who used (a) induction through grouped primal functions method; (b)induction through primal functions method; (c) induction through partially primal functions method; (d) rational form; (e) irrational non-orthogonal form; (f) irrational curvilinear form

5. Conclusion

This research has aimed to discuss factors which influence function and form decisions of students in design stage of the interior architectural project phase. In this context, upon examination of projects created in design studio it can

be seen that the method choices of induction through grouped primal and primal functions and induction through partially primal functions are significantly close to each other. Similarly, rational and irrational form choices are also equal. The survey shows that students who have designed their projects in methods of induction through grouped primal functions and induction through primal functions describe the influential factors as ease of solution, traditionality, ease of use and applicability. Students who have designed their projects in the method of induction through partially primal functions describe the influential factors as spatial personalization, user identity and designer identity. Under the title of form, students who have applied the rational form decision in their projects describe the influential factors in their decision-making process to be ease of solution, traditionality and applicability. Students who have applied irrational non-orthogonal and irrational curvilinear form decisions in their projects are influenced by factors like user identity, designer identity and unique form creation.

The experienced project phase in interior architectural design studio and the design problems faced in the professional life bear great resemblance to each other. Induction methods through grouped primal and primal functions or the use of rational form are similarly preferred in professional life for reasons like ease of solution, traditionality and applicability. Likewise, the method of induction through partially primal functions, which requires a more original solution or the use of irrational non-orthogonal and curvilinear form, is likely to be preferred in line with the designer's aspiration in professional life to create a unique and original design, by avoiding monotony and creating a personal environment suitable for the needs of a specific user.

When experiencing the interior architectural design process, the perspectives, methods and influential factors of interior architecture students, in function and form problems are seen as parallel to those in professional life. One of the most important reasons is that the design studio runs like a miniaturized model of the professional life. The occupational problems of students in the future will diminish as the education in design studios grow more similar to the practice of professional life.

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