

# An Analytical Approach On Improvement Of Kitchen Design Performance In Terms Of Psycho-Social User Requirements In Turkey

Deniz Ayşe Yazıcıoğlu

Istanbul Technical University  
Interior Architecture Department, Turkey

## ABSTRACT

A kitchen design with high performance can be achieved only by creating appropriate solutions in line with the requirements of the person(s) who will use the kitchen. User requirements are mainly divided into two groups as physical requirements and psycho-social requirements. One of the psycho-social requirements of users can be considered as aesthetic needs. When we consider aesthetic requirements in the design of the kitchen we see that the most important components are the countertop material and the cabinet door type and the visual harmony between them. The target and objective of this study in this context is to obtain the statistical data revealing which cabinet door type is used in combination with which countertop material in kitchen design and convert the results incident to such statistical data into a meaningful data analysis table that will help the designer to make the right decision in the choice of cabinet door type and the countertop material. The cabinet door types and the countertop materials which will be studied have been defined at the first stage as the methodology of this study within the purview of this defined scope and purpose with the grounds thereof. Subsequently, 1.309 actual kitchen projects have been examined in order to obtain statistical data showing the relationship between the countertop materials and the cabinet door types. In the final stage of the study the mathematical relationship between these statistical data obtained as a result of these examinations have been converted into a meaningful data analysis table.

**Keywords:** Interior architecture, kitchen design, performance based design, countertop material, cabinet door type.

## INTRODUCTION

It is a reality expressed in literature that evolving and changing conditions in the field of interior design and the application thereof has to be taken into account and restructuring efforts in this direction must be inevitably performed. In this approach, it is inevitable to determine "performance" as one of the key concepts and rethink the whole process of in the context of "performance-based design" [1; 2; 3].

Performance is a measurable phenomenon. Level of performance and criteria in the achievement of a target is the important issue. Performance in interior design has been one of the main issues dealt with in recent years. Kitchen is the field which is one of the most studied areas with a view to improve the performance of interior design. The reason for this is that it is the most important area of working compared to other areas and as such the area from which high performance is expected in terms of numerous criteria such as functionality, durability and hygiene. It has been observed in the research conducted that much as an average of two hours is spent in the kitchen during the day, the cupboards are opened and closed more than 80 times during this time of and activities as to different functions are repeated more than 50 times [4]. Furthermore, kitchen is the area which is renewed mostly by 34% and again it is the most costly area in terms of design in a house [5; 6]. In addition to

all these, kitchen is the area for a designer which has to be resolved almost in all projects. [2; 3].

When we examine the studies conducted in kitchen design performance it can be seen that Cline [7] examines the performance of kitchen design criteria for impaired users. Rivette's [8] work is concerned with the performance of the kitchen ventilation system. Lamkins [9] examines the performance of the kitchen sink systems. Panwar [10] evaluates the design and performance incident to effective use of gas in the ovens. O'Heir [11] indicates that use of industrial products equipped with digital technology in kitchens will improve the design performance of this space. In the study of Lyon et al. [12] types of cooking depending on the age of the users have been evaluated and the design 'performances of the kitchens were examined in this context. Fishwick's [13] work makes recommendations for improving the performance of the kitchen in terms of the safety. When we examine Asensio and Ubach [14], Baden-Powell [15], Beazley [16], Cerver [17], Conran [18], David [19], Edic and Edic [6], Jankowsk [20], King [21], Lovett [22], Rand and Perchuk 's [23] studies it is observed that they explain basic design principles regarding the project planning process in order to increase the kitchen design performance. Grandjean [24], Panero and Zelnik [25], Pheasant [26], Rymal [27] and Salvendy's [28] studies explain the standards as to human dimensions and the design criteria depending on these sizes with an eye to increase the kitchen design performance [2].

It has been determined that scientific studies with a view to increase the kitchen design performance as a result of all these researches are mainly divided into two groups. The first group of these is the ones about industrial performance of kitchen products. Studies in the other group explain the basic design rules with a view to increase the kitchen design performance [2].

A kitchen design with high performance can be achieved by producing appropriate solutions in line with the needs of the person(s) who will use the kitchen. User requirements denote all the environmental and social conditions that help people to sustain their lives without discomfort as to physiological, social and psychological aspects. In other words, they determine the minimum qualifications that have to be in a space. Any deficiency in these qualities creates discomfort for the user [29]. User requirements are basically divided into two groups as physical and psycho-social needs of the users [30]. Physical user requirements are classified as spatial, thermal, auditory, visual, health and safety requirements. The psycho-social user requirements are privacy, behavioral and social and aesthetical needs [31; 32].

One of the most important psycho-social user requirements are aesthetics requirements. Aesthetic requirements are values based on visual effect regarding the space that will enable users to be satisfied psychological [33]. Considering the aesthetic requirements in the design of the kitchen, the most important components are the countertop material and the cabinet door type and the visual harmony between them. The reason for this is that almost all kitchen furniture consists of these two components. In other words, selection of countertop material and cabinet door type has to be made in the most correct way in order to increase the success of the kitchen design from the psycho-social aspect.

In this context, it was investigated in the first phase of the study if there are scientific methods by which the designer can make the selection of countertop material and cabinet door type during the process of kitchen design model in a manner to be harmonious with each other. Numerous design tips have been found as a result of the literature researches carried out

within this context for determining countertop material and cabinet door type however scientific data showing the relationship between these two design decisions has not been found [14; 15; 16; 17; 18; 20; 21; 22; 23; 34; 35; 36; 37; 38; 39; 40; 41; 42; 43; 44; 45; 46; 47; 48; 49].

### PURPOSE AND METHODOLOGY

The target and objective of this study in this context is to obtain the statistical data revealing which cabinet door type is used in combination with which countertop material in kitchen design and convert the results incident to such statistical data into a meaningful data analysis table that will help the designer to make the right decision in the choice of cabinet door type and the countertop materials. The cabinet door types and the countertop materials which will be studied have been defined at the first stage as the methodology of this study within the purview of this defined scope and purpose with the grounds thereof. Subsequently, 1.309 actual kitchen projects have been examined in order to obtain statistical data showing the relationship between the countertop materials and the cabinet door types. In the final stage of the study the mathematical relationship between these statistical data obtained as a result of these examinations have been converted into a meaningful data analysis table.

### DETERMINATION OF THE CABINET DOOR TYPES AND THE COUNTERTOP MATERIALS THAT WILL BE ANALYZED WITHIN THE PURVIEW OF THE STUDY

The countertop materials and the cabinet door types used in interior design were found to be in a large number after the research made. However, when countertop materials and the cabinet door types of the company's product line which was taken as example were examined it was observed that they are as in Table 1. Therefore the study will be based on only countertop materials and the cabinet door types seen in Table 1.

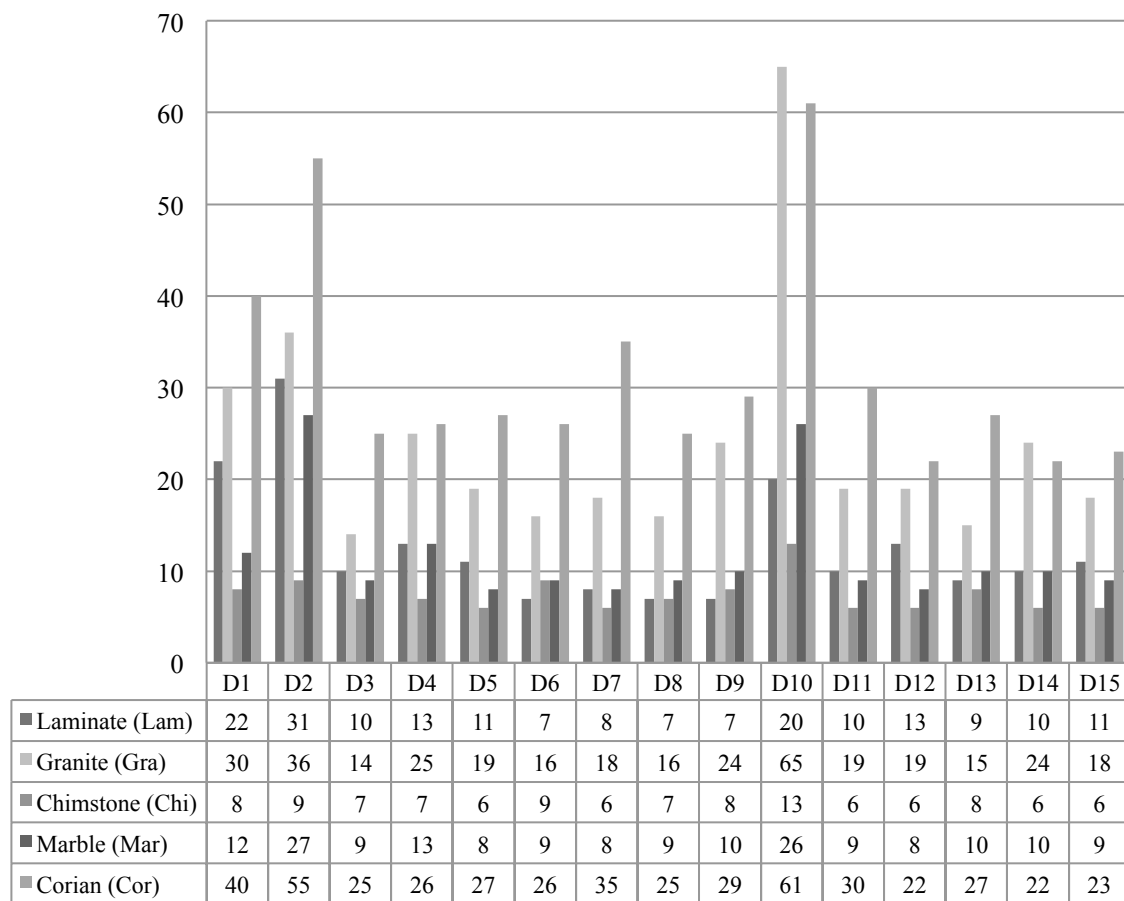
**Table 1.** The countertop materials and the cabinet door types of the company which was taken as example

Cabinet Door Type		Countertop Material	
Name	Description	Name	Description
D1	Laminated chipboard (Juglans, Lime oak, Natural, Leandro walnut, Teak)	Lam	Laminate
D2	Laminated MDF (Framed Italian walnut, Framed natural)	Gra	Granite
D3	Matte PVC-polyester coated MDF (Vanilla, Tobacco)	Chi	Chimstone
D4	MDF veneered with matte PVC-polyester combination (Ecrú)	Mar	Marble
D5	Chipboard veneered with textured PVC-polyester combination (Smartlam cacao, Smartlam natural oak, Smartlam white)	Cor	Corian
D6	MDF veneered with matte PVC-polyester combination (White)		
D7	Solid wood door (Chestnut)		
D8	Solid wood door (Walnut)		
D9	MDF veneered with glossy PVC-polyester combination (High glossy zebrano, High glossy ebony)		
D10	MDF veneered with glossy PVC-polyester combination (High glossy coffee, High glossy cappuccino, High glossy white, High glossy vanilla, High glossy burgundy, High glossy black)		
D11	MDF membrane veneered (Refined oak)		
D12	MDF membrane veneered (Refined walnut)		
D13	Solid wood door (Oak, Venge)		
D14	MDF glossy varnish (Apple green)		
D15	Solid wood door (Cherry)		

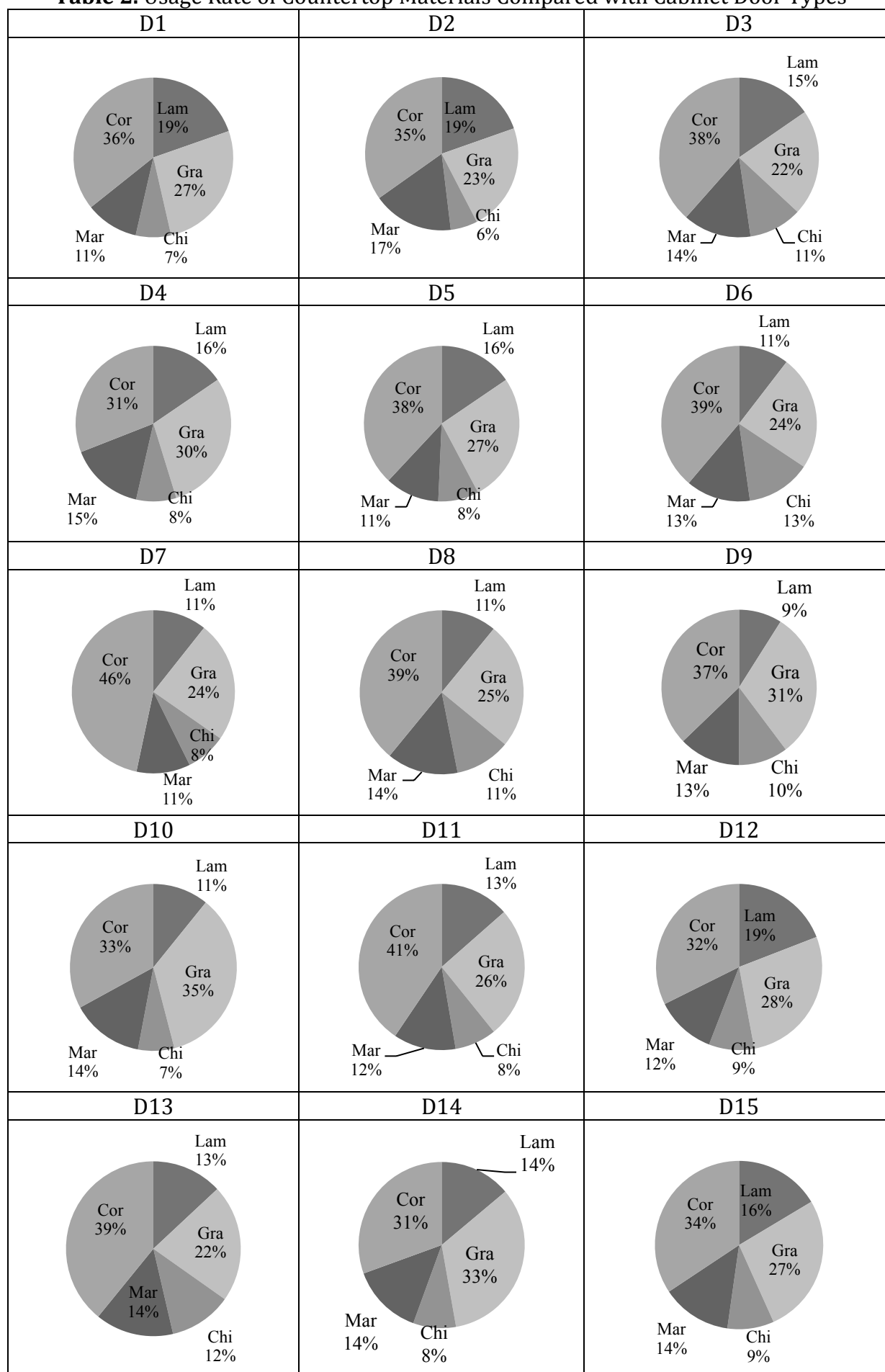
## OBTAINING THE STATISTICAL DATA SHOWING THE RELATIONSHIP BETWEEN THE COUNTERTOP MATERIALS AND THE CABINET DOOR TYPES

1.309 actual kitchen projects obtained from a company that has dealers in different cities of Turkey has been analyzed by using an architectural CAD software named ArchKitchen with an eye to obtain the statistical data showing the relationship between all countertop materials and the cabinet door types determined at the previous stage of the study. The reason for preference of ArchKitchen software in this study is because the company employs the same software in delivery and order of the kitchen projects and the presence of all three-dimensional kitchen projects of the company in the cited software. As such, in lieu of performing data collection by hand they were performed via computer by virtue of ArchKitchen software and in this way significant time saving was realized. As a result of the examinations made, numerical distribution of statistical data revealing which cabinet door type is used in combination with which countertop materials has been seen to be as shown in Figure 1.

**Figure 1.** Distribution of statistical data revealing which cabinet door type is used in combination with which countertop materials



It was analyzed separately which cabinet door type is used in combination with which countertop materials in order to make it meaningful for the designer in utilizing in the selection of cabinet door types and countertop materials in Figure 1 at this stage of the study. As a result of this analysis results in Table 2 were achieved.

**Table 2.** Usage Rate of Countertop Materials Compared with Cabinet Door Types

## STATISTICAL DATA ANALYSIS FOR PROVIDING VISUAL HARMONY OF CABINET DOOR TYPES AND COUNTERTOP MATERIALS

The statistical results showing the relationship between countertop materials and cabinet door types obtained from 1.309 real kitchen projects were interpreted in Table 2 in a systematic way and converted into a data analysis table which the designer can use in selection of countertop materials and cabinet door types (Table 3). The selection of countertop material in harmony with cabinet door type will be made in a more convenient way regarding aesthetic aspect and this will make it possible to increase the kitchen design performance in terms of requirements psycho-social users.

**Table 3.**Data Analysis showing the relationship between countertop materials and cabinet door type

Countertop Materials	Cabinet Door Type
Laminate	D1 and D2 are the cabinet door types with which laminate countertop materials are used most. D9 is the cabinet door type with which laminate countertop materials is used less.
Granite	D10 is the cabinet door type with which granite countertop material is used most. D9 is the cabinet door type with which granite countertop material is used less.
Chimstone	D13 is the cabinet door type with which chimstone countertop material is used most. D6 is the cabinet door type with which chimstone countertop material is used less.
Marble	D2 is the cabinet door type with which marble countertop material is used most. D1, D5 and D7 are the cabinet door types with which chimstone countertop material is used less.
Corian	D7 is the cabinet door type with which corian countertop material is used most. D4 and D14 are the cabinet door types with which corian countertop material is used less.

## RESULTS

The designer will be able to see which cabinet door type is used in combination with which countertop material by looking at the results in Table 2 and Table 3 obtained through statistical data. Selection of materials for the kitchen countertop will be performed in a more harmonious way with the cabinet door type thanks to these tables from the aesthetical aspect and this will make it possible to increase the kitchen design performance in terms of psycho-social user requirements. In addition the following results are seen thanks to these tables: the most preferred countertop material among 1.309 kitchen projects is corian with 36% while the less preferred countertop material is chimstone with 9% compared. Similarly the most preferred cabinet door type is D10 with 14% and D2 with 12%. This and similar information will in particular help to the kitchen producers which make wholesale as well as the seller companies for a more accurate determination of the amount of their stocks.

## References

- [1] Arslan, S. and Kanoğlu, A. (2010). Başarım Tabanlı Yapım: Anahtar Kavramlar, Olanaklar, Bariyerler ve Bir Model, 1. Proje ve Yapım Yönetimi Kongresi, 29 September-1 October 2010, ODTÜ Kültür ve Kongre Merkezi, Ankara.
- [2] Yazıcıoğlu, D.A. (2014). "A Statistical Data Analysis for Increasing The Kitchen Design Performance", *İTÜ AIZ*, Spring Vol.11, No.1, pp.174-184.
- [3] Yazıcıoğlu, D.A. (2014). "An Analytical Approach on Material Selection For Increasing Design Performance in Interior Architecture Projects", *Academic Research International*, Vol.5(3), pp.1-11.
- [4] Dynamic Space. (2008). Tool For Evaluating Kitchens, <<http://www.dynamicspace.us/dynamicspace/en/04/01/06/index.html>>, viewed: 5 October 2008.

- [5] Amana. (2010). Kitchen 'Top of Mind' For Design Upgrades: Amana Survey, Reveals Reported in Kitchen and Bath Design News, <<http://prestige123.com/What's-New.html>>, viewed: 13 February 2010.
- [6] Edic, M. and Edic, R. (1999). *Kitchens That Work: The Practical Guide to Creating a Great Kitchen*, The Tauton Press.
- [7] Cline, H. L.(2006), The Evaluation of Universal Design Kitchen Features by People in Wheelchairs, Virginia Polytechnic Institute and State University, ProQuest, UMI Dissertations Publishing.
- [8] Rivet, B.(2009), Kitchen Ventilation Systems: Saving Energy Without Sacrificing Performance, Consulting - Specifying Engineer, Vol.46, No.4, 6-8.
- [9] Lamkins, C. (2011), Kitchen and Bath Design: Sink Systems, Professional Builder.
- [10] Panwar, N. L. (2009). Design and Performance Evaluation of Energy Efficient Biomass Gasifier Based Cookstove on Multi Fuels, Mitigation and Adaptation Strategies for Global Change, Vol.14, No.7, 627-633.
- [11] O'Heir, J. (2007), Cooking Up a Digital Kitchen, Dealerscope, Vol.49, No.8, 50.
- [12] Lyon, P., Mattsson Sydner, Y., Fjellström, C., Janhonen-Abruquah, H. and Schröder, M. (2011), Continuity in The Kitchen: How Younger And Older Women Compare In Their Food Practices And Use Of Cooking Skills, International Journal of Consumer Studies, Vo.35, No.5, 529-537.
- [13] Fishwick, T. (2006), Stay Safe in The Kitchen - Despite The Heat, Loss Prevention Bulletin, Vo.191, 23-26.
- [14] Asensio, P. and Ubach, M. (2003). *Kitchen Design: Kuchen Design*, teNeues Publishing Group, Kempe, pp.27-29.
- [15] Baden-Powell, C. (2005). *Architect's Pocket Book of Kitchen Design*, Elsevier, Maryland Heights.
- [16] Beazley, M. (1999). *The New Kitchen Planner*, Ocopus Publishing Group Ltd, London.
- [17] Cerver, F.A.(2006). *Ultimate Kitchen Design*, The Neues Publishing Company.
- [18] Conran, T. (2002). *Kitchens The Hub of The Home*, Conran Octopus Ltd, London.
- [19] David G. (1994), *Smart Kitchen: How to Create a Comfortable, Safe, Energy-Efficient, and Environment-Friendly Workspace*, Ceres Press.
- [20] Jankowski, W. (2001). *Modern Kitchen Workbook: A Design Guide for Planning a Modern Kitchen*. Rockport Publishers, Beverly.
- [21] King, H. T.(2006). *Design Ideas For Home Decorating*. Creative Homeowner Press, Emeryville.
- [22] Lovett, S. M. (2006). *The Smart Approach to Kitchen Design*. Creative Homeowner Press, Emeryville.
- [23] Rand, E. and Perchuk, F. (1991) *The Complete Book of Kitchen Design*, Consumer Reports Books, New York.
- [24] Grandjean, E. (1973), *Ergonomics of the Home*, Halstead Press, Division of John Wiley & Sons, New York.
- [25] Panero, J. ve Zelnik, M. (1979), *Human Dimension & Interior Space: A Source Book of Design Reference Standards*, Watson-Guptill Publications, New York.
- [26] Pheasant, S. (1996), *BODYSPACE Anthropometry, Ergonomics, Design*, Taylor & Francis, London and Philadelphia.
- [27] Rymala, M. (2011). *Application of Ergonomics in Kitchen Designing - Indian Perspective: Use of Anthropometric Measurements, Environmental Factors and Comfort Features For Efficient and Pleasant Cooking*, LAP LAMBERT Academic Publishing.
- [28] Salvendy, G. (1997), *Handbook of Human Factors and Ergonomics*, Wiley Interscience, U.S.A.
- [29] BaÜ. (2005). Mimarlığa Giriş, <<http://bauarchitecture.files.wordpress.com/2010/09/ders-2.pdf>>, viewed 22 March 2014.
- [30] Kiran, A. and Polatoğlu Baytin, Ç. (2006), *Bina Bilgisi' ne Giriş*, Yıldız Teknik Üniversitesi Basım-Yayın Merkezi, İstanbul.
- [31] Arcan E.F. and Evci F. (1992), *Mimari Tasarıma Yaklaşım 1-Bina Bilgisi Çalışmaları*, İki K Yayınevi, İstanbul.
- [32] Yazıcıoğlu, D.A. (2014). "An Analytical Approach for Cabinet Door Type Selection in Kitchen Design", Academic Research International, Vol. 05 No.04, pp.14-22.
- [33] Korur, S., Sayın, S., Oğuzalp, E.H. ve Korkmaz, S. Z. (2006). Konutlarda Kullanıcı Gereksinmelerine Bağlı Olarak Yapılan Cephe Müdahalelerinin Fiziksel Çevre Kalitesine Etkisi, Selçuk Üniversitesi Mühendislik-Mimarlık Fakültesi Dergisi, c.21.

- [34] Beamish, J., Parrott, K., Emmel, J., Peterson, M.J. (2013). *Kitchen Guidelines, Codes, Standarts*, NKBA, Wiley, Canada.
- [35] Bouknight, J.K. (2013). *Kitchen Idea Book*, Taunton Press.
- [36] Brunk, G. G., Kovach, S. and Michael Jones, M. (2003). *The Complete Idiot's Guide to Remodeling your Kitchen Illustrated*, Alpha.
- [37] Calley, E. (2007). *Kitchens: Creating Beatiful Rooms From Start to Finish*, House Beatiful Design and Decorate, Hearst Corporation.
- [38] Clark, S.(2003). *Remodelling a Kitchen*, The Taunton Press.
- [39] Cool Springs Press (2013). *The Complete Guide to Cabinets and Countertops*, Cool Springs Press.
- [40] Goldberg, J.(2012). *New Kitchen Ideas that Work*, Taunton Press.
- [41] Grey, J. (2002). *The Art of Kitchen Design*, Cassell.
- [42] Hufnagel, J.A. (1991) *Kitchens: Design, Build, Remodel*, Creative Homeowner Press, Emeryville.
- [43] Maney, S.(2003). *The New Smart Approach to Kitchen Design*, Creative Home Owner.
- [44] McLellan, T. (2003). *Small Spaces, Beautiful Kitchens*, Rockport Publishers.
- [45] Meyer, L. and Roth, R. (2007). *Remodel This: A Woman's Guide to Planning and Surviving The Madness of a Home Renovation*. Perigee, London.
- [46] Mielke, R. (2005). *The Kitchen*, Feierabend Verlag, Ohg.
- [47] Sweet, F. (2003). *Kitchen Essentials*, Ryland Peters and Small, Inc., New York.
- [48] Taylor, L. (2003). *Kitchens*, New Holland Publishers Ltd., London.
- [49] Veillette, B. (2007). *Kitchen Ideas that Work: Creative Design Solutions for Your Home*, Taunton Press.