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# Affected Variables on Successful Infill Design in Urban Historic Context

Hesamaddin Sotoudeh\*      Wan Mohd Zakri Wan Abdullah  
School of Built Environment, UTM University, Malaysia Po code 31810, Skudai, Johor, Malaysia  
\* E-mail of the corresponding author: hesam.hds@gmail.com

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## Abstract

The development of historic preservation as a professional field has, to some extent, created a divide between the discipline of preservation and the practice of architecture. This paper is based on the ongoing research that concerns with new architectural intervention in urban historical context. In field of architectural design for new developing in historic context when designing adding within a historic context, it is important to understand the design principles that gave rise to the existing conditions. New building's appearance and its relationship to its surroundings is a serious design problem that has become a significant issue in many places. The intention of this research is to take a closer look at the use of compatibility and contrast design for new additions to historic buildings and establishes which factors affect on architectural designing in historic context and how these factors fit aesthetically into historical context. Methodologically, a case study approach was adopted whereby the contributive elements to the quality of aesthetic fitness would be identified through quantitative and qualitative analysis and synthesis. Two initial findings showed that compatibility, visual harmony, meanings and appropriate architectural design tools are of the utmost significance to achieve the idea of aesthetic fitness when dealing with such urban environmental setting.

**Keywords:** Aesthetic fitness, compatibility, contrast, historic context, infill design

## 1. Introduction

Historic urban sites and traditional context are the most important evidence of the past life style. The conservation of these traditional values in the context of conservation and revitalization of architectural heritage is in a sense the preservation of culture. The main goal of conservation is to enliven cultural properties by evaluating their architectural, historical, environmental, visual and aesthetic characteristics (pekog'lu, 2005). Historic preservation or heritage conservation is a professional endeavor that seeks to preserve, conserve and protect buildings, objects, landscapes or other artifacts of historic significance. The development of conservation principles in the second half of the 20th century has been regarded by many as the most significant achievement of conservation activities internationally. These principles or guidelines, promulgated either as charters, recommendations, resolutions, declarations or statements, were drafted and adopted mainly by international organizations, such as UNESCO and ICOMOS, with the aim to protect cultural property, which includes historical monuments, buildings, groups of buildings, sites and towns around the globe, against various threats (Ahmad, 2006). Addition to historic settings has always been a big issue in the preservation field. There have been many discussions about the proper way to approach a historic context when it is in need of development to create more usable building for a new or expanding use. In the postwar period, an important issue for preservation has been defined as how new construction might appropriately support and enhance, rather than detract from, historic buildings and districts under regulatory protection (Semes, 2007). Therefore, the construction of new buildings within historic districts or areas contains a significant number of historic buildings is often a difficult design problem. The demands of new construction and building programs often make it difficult for new building to fit in a sympathetic manner with the existing urban fabric.

## 2. Research Background

### 2.1 Responses to historical context

Historic city cores consist of unique arts and architecture amidst vibrant culture, tradition and ritual practices. The traditional compact planning is interrupted by spaces endowed with special character that they are testimony to existence and development of the spirit. But today, this spirit is missing due to its deteriorating spatial quality. There are many interlinked threats to the spirit of the space which lead to abandonment, loss of cultural heritage

and sustainable practices (Rai, 2008). At present, the focus of historic place is largely on monuments and houses but what traditional urban place needs is proper management and appropriate new intervention to maintain the cultural values and relevant to the changing time. Responses to the challenge of development in historical areas have been varied. There are those who want to mark a complete break architecturally with the past, like Daniel Libeskind and Frank Gehry, who believed that new development should simply reflect its own time. Yet, there are others, like Raymond Erith and Norm Tyler, who believed that what is important is to preserve the character of the conservation area at all costs. The balance between them has been shifting from time to time in response to changing fashion and opinion and the gradual accumulation of experience (CABE, 2001). These two different attitudes toward intervention in historic areas might have led to two simplified positions and both these positions have led to unsatisfactory outcomes in many cases. In general, when additions or new construction are proposed for historical settings of great value, they should be designed in such a way that the new construction is distinguishable from the historic fabric by informed observers or trained professionals but is otherwise continuous in character with the historic setting. No differentiation should be made that would result in an incongruous or ugly contrast "Adding that which may be valued in the future is vital to sustaining cultural values in the historic environment" (Semmes, 2009). Attitudes toward the design of additions and infill buildings inevitably reflect one's preferences in the architecture of the present day, and battles over style and language in contemporary design have made debate on this issue increasingly heated. At the center of the debate is the question of the proper balance between continuity and difference.

## 2.2 Urban historic context and design strategies

Attitudes toward architectural design, most of the time, reflect architects' personal preference in contemporary design even though it is governed by design guidelines set by relevant commissions, organizations and/or local councils. An important aspect of appropriate design is measured based on its viability and vitality qualities to the context it is going to fit in (Wan Mohd Zakri Wan Abdullah, 2008) or its responsiveness to that particular setting (Bentley, 1985). There are a lot of design guidelines by commissions, organizations and city council. For new addition into urban historic context, there are no simple rules for achieving quality of design in new addition, although a clear and coherent relationship of all the parts of the new work to the whole, as well as to the setting into which it is introduced is essential. New work should aspire to a quality of design and execution related to its setting, which may be valued both now and in the future. This neither implies nor precludes working in traditional or new ways, but demands respect for the significance of a place in its setting (English Heritage, 2007). The 1964 Venice Charter-considered the founding document of the modern preservation movement-declares that the purpose of conserving and restoring historical monuments is to "safeguard them no less as works of art than as historical evidence." But it also states any addition to the landmark must be "distinct from the architectural composition and must bear a contemporary stamp" (ICOMOS, 1964). The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings, first issued in 1977, were closely based on the Charter and called for additions to be at the same time "differentiated" from the historic fabric and "compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment" (Penn, 2007). Both the Charter and the Standards assumed that any new work would be modernist in style and would need to be monitored to ensure compatibility. Establishing a congenial relationship with neighboring buildings can be achieved using an infinite variety of techniques, however generally two major fundamental approaches are usually decided upon at the initial design stage and applied to various degrees: replication or contrast (Elshe, 1994). As Brodin (1980) explained: "There are a variety of ways to design a new building so that it is sympathetic to its architectural context . . . One may literally copy architectural element from the surroundings; on the other hand, one may use totally new forms to evoke, perhaps even enhance, the visual flavor of existing buildings". Following are some of these techniques:

a. Replication: Relating a new building to its context by duplicating: copying imitating or reinterpreting its older neighbor is the most widely used approach to architectural compatibility. As Groat (1987) pointed out: "This emphasis on replication of specific elements is frequently manifested in discussions of contextual design in the professional magazines as well as in many design guidelines for historic districts," However the degree of replication may vary and as Shane (1976) pointed out four levels of correspondence might be observed: "facsimile, Correlation, simile and metaphor".

1. Facsimile: Exact imitation or mirroring of older facades is the extreme level of replication used generally in sensitive historical sites. The replication is more appropriately used in the case of a group of historic buildings forming a totality. Serially organized and giving the environment its character rather than in the case of dispersed isolated historic building usually differentiated from their surroundings by a monumental size, shape, materials

and texture. The extreme example of this approach was the exact replication of war-torn cities in Europe, where facades, streets spaces and entire urban districts were recreated based on pictures and art works, since they were seen as crucial to the national identity.

2. Correlation: Achieving harmony by relating design features or elements relationships of the new building to its older neighbor is the most widely used approach by architects and the most favored by review boards and planning departments, "The major point of the theoretical problem, as distinct from the technical problem, is one of style and design. There seems to exist a common bias that new buildings should not imitate the style of old buildings but should find appropriate and harmonious relationships with them through control of volume, mass, scale, color, materials and textures"(1980). Smith (1977) also commented that: "This is because it is by far the easiest way of ensuring a measure of correspondence, however singular the architecture". Whether by copying the material or by lining up windows, eaves or string courses, this relational approach is accused of producing monotonous environmental, deprived from the vitality of tension needed for stimulating an enjoyable aesthetic experience.

3. Simile: Copying specific design features from the prevailing style(s) to establish a visual conceptual link as demonstrated in ecclesiastical architecture. As Shane (1976) explained: "To establish a link between architecture and a particular philosophy designers may employ visual cues which betray the allegiance of the building: modernized gothic arches or abstract stained glass", This approach is chosen mostly in cities with a predominant architectural style, usually of some historical significance where the new reflects the spirit or the whole by the use of older details, or geometrical principles (Smith, 1977).

4 .Metaphor: Michael Graves and Gary Wolf in "Beyond Mere Manners and Cosmetic Compatibility" (Michael Graves and Gary Wolf , 1980) indicated thus replication does not have to be of a cosmetic nature, copying design elements and relations to achieve a harmony with the context, instead it should go beyond such superficiality and consider more significant issues such as the "symbolic and cultural aspects of architecture and the metaphorical and ritualistic roles of the buildings that make them significant settings for human activities." By using some symbols or metaphors from the past, the new can be related to the old whether it is at the phenomenological or imagery level.

b. Contrast: is usually used where a coherent background forms a setting against which the new infill stands out. A minimum ratio or background to object is needed to achieve the balance needed in a contrasting relationship. However, as Overby (1980) warned, if used carelessly, contrast can result in disorder and confusion: "Pursued wantonly contrast has a facile ability to destroy itself, translating into chaos, more imitating than interesting. If contrast is the object, then the character and permanence of the setting must be an integral part of the design concept. Contrast strategy is usually encouraged on the basis of human psychological need for variety and stimulation.

Michael Davies (2003) believed that there is therefore more than one way to design in the historic environment, and much will depend upon other influences, such as the aspirations of the building owner, cost, the aesthetic sensibilities of the planners, the skill of the designer, and so on. He believed that "as in age and politics, design for the historic environment is polarized by two extremes: the very historic and the very modern. Then everything else fits somewhere in between on a sliding scale, and it is possible to place any building on the scale to determine its stylistic relationship with its surroundings". He considers 5 different approaches to design: pastiche approach, traditional approach, subtle approach, Modern approach, arrogant approach. Semes also has same opinion and mention that the balance between differentiation and compatibility will, in fact, vary from case to case, and so the architect-preservationist must approach each project with a range of options rather than a single rule. Putting aside questions of particular style or language, can be defined a set of four possible attitudes toward the relationship of new and old, ranging from maximum compatibility to maximum differentiation, with two intermediate positions that favor one or the other: literal replication, invention within a style, abstract reference, and intentional opposition (Semes, 2009). Therefore, for designing in historical context there are variety strategies which define as range between compatibility and contrast. In case of historical setting as cultural heritage, decision making for designing needs some particular consideration and understanding of context to respecting and continuing visual harmony for this area with special values, because of this matter finding key elements and some basic principal for designing is essential.

### 3. Integrating of variety ideas

As it has been mentioned previously, new designing in historical context is considered a range between compatible to contrast, moreover in the field of architectural intervention (infill design), lead organization, like

ICOMOS, has been encouraging new design to be distinguishable from settings to protect of historic fabric and compatible with context for respecting and continuing harmony in the historic fabric (Semes, 2007). Generally lead organizations try to establish respecting to the contexts and consideration of visual harmony in historical context during new developing. As a result of this interest in the architectural heritage, more local governments and citizen's groups are trying to control architectural additions to their urban settings by using various strategies: applying codes, regulations and design guidelines, reviewing new design proposals and encouraging public participation in the decision making process of approving new designs. Moreover, control and management of architectural projects' aesthetics are increasingly being supported in the courts (Crumplar, 1974. Brace, 1980). As a result of these regulating measures and the increased concerns about the issue of new buildings in historical setting, new designs can be considered aesthetically fit as major evaluative issue.

Semes (2007) and Davies (2003) strategies provide a useful framework for examining recent buildings in historic districts. However, both of them does not address the questions of how can achieve a balance between relationship to context and contemporary design? And what specific elements of design enable a new building to have an aesthetic fitness relevant to an historic district and to create continuity of character. Therefore, that is very important to find some basic principles for creating an urban design evaluation to be used to evaluate the relationship of proposed new projects to their immediate surroundings. While this evaluation principle was not developed explicitly for historic districts, many of the issues to be considered and many of the questions to be asked about a new project are applicable to historic districts. Because of this matter, the increasing concern about aesthetic fitness for designing in urban historic setting is very helpful because aesthetics is an important aspect in the analysis of environmental impact of design of buildings and open spaces (Reis,2010), also aesthetics and community appearance is too important to be left to developers or to designer intuition, which often clashes with public values like historic context value (English Heritage, 2007). Architectural aesthetics is a coherent system of criteria which are formal and symbolic at the same time. The formal is concerned with questions of proportion, harmony and contrast, etc... The symbolic is concerned with heuristic symbolism. Both of these aspects of aesthetics must be dealt with in an investigation of the issue of fitness (Nasar, 1997). Previous discussion on aesthetic suggests two kinds of building features as relevant concerns for urban design aesthetics: those that relate to the structure of forms for their own sake and those that relate to content of forms. The study of the structure of forms has been called formal aesthetics, and the study of human responses to the content of forms has been called symbolic aesthetics (Lang,1988). With this definition of aesthetic if a building fits aesthetically to its context with historic value, inevitably should consider and respect to the setting and surrounding. For high degree of visual harmony in historic context, it is very helpful to consider formal aesthetic fitness with tangible values and symbolic aesthetic fitness to the intangible values of urban historic setting.

#### **4. Methodology**

This research focuses on the aesthetic qualities of building elements and contextual characters to establish aesthetic fitness of new architectural design in historical context. As it discussed previously, there are two kinds of building features as relevant concerns for urban design aesthetics: formal aesthetics and symbolic aesthetics (Nasar, 1997). This study attempts to identify the physical elements those contribute to achieving formal aesthetic fitness and also explores the effect of symbol aesthetic on new building in historical context. Methodologically, this research adopts case study approach because it deals with site specific that is the utmost importance in architectural research (Johansson , 2004) that it is selected Shiraz, one of historical city in Iran. The research approach to investigate the above aspects was to conduct a Survey approach which experts would be directly considered in their perceptions of new buildings' relationships with their historical settings and their preference and attitudes toward aesthetic fitness in the built environment. For questionnaire survey designed two independent variables: a. The participants' background, measured by their formal training as designers, b. The respondents' perceptions of aesthetic fitness in the historical context measured by: 1- their concern about the notion of fittingness between new and old neighboring structures; 2- their preference ratings of aesthetic predictors for new and old building's relationships. The two dependent variables are: a. the contextual design strategy used in the new buildings, measured by range between high compatible to high contrast of adjacent structures' design features, buildings' elements perceived to play an important role in the success or failure of the contextual design. b. the participants' attitudes toward change in the built environment as measured by: 1- the perceived appropriate measures of controlling new development; 2- The relative importance of the new building's impacts on the historical context; and3- the preferred level of variety in buildings' features.

The questionnaire included four sections with close-ended question. The first section searches for background information of respondents. The second section related to scenes of new and old buildings or additions to historical context. Respondents rated these on how much they like the relationship between the new and the old buildings. In a close-ended question they were asked to indicate a new building that they thought related best and least well to

their surroundings which of predictors and key cognition properties of aesthetic affected on their decision, and the importance of aesthetic relationship between new and old buildings in historical context. The third section asks to preference of participants to degree of similarities between elements of new building and historical surrounding. The last section ask about different impacts of the new buildings on historical context; the desirability of preservation or change in the historic setting; and their preference level of variety in the different elements of their built surroundings. All questions were rated using a 5-point scale, the labels for the points on the scale varied but in all cases a rating of 1 was the lowest or the most negative assessment and a rating of "5" was the highest or the most positive. The study's design required the professional's respondents who are involved in the development and the building activities in the city, especially in historic context and residents that have been living above 5 years in the historic context. Despite lack of experts that introduce with the historical context of Shiraz cause that 240 questionnaires were distributed and 90 questionnaires were returned.

## 5. Discussion and Findings

The town of Shiraz in Iran was selected as the case study as its historical core is still intact and yet experiencing rapid physical development. For this research, only feedbacks from practicing professionals of architects, town-planners and policy makers were utilized as they are the people who directly involve in shaping the concerned physical urban environment. A pilot survey was carried out in July and August 2011. The data from the survey was analyzed using SPSS version 19. Overall, the initial survey finding which analyzed with SPSS program showed that for whole question cronbach's alpha test rate was .817 that shows reliability of questionnaire, Also for aesthetic fitness design the reliabilities of the professional ratings for the 7 properties of formal aesthetic were: Visual harmony, .80; familiarity, .81; pleasant, .82; compatibility, .81; simplify, .81; meaningful, .81; complexity .81, high mean for this part related to visual harmony, 4.3, compatibility 4.3, meaningful, 4.7 that means for professional these variable for designing in historic context are very important. For third part during 35 building characters, analyses showed some building characters like materials, color, surface, proportion, opening, arrangement, shape, scale, linear, plane, enclosures, style and order are more important than another characters in compatible design in historic context.

The first finding was that the perceived visual harmony, compatibility and meanings are the three most important design aspects among the professionals toward achieving aesthetic fitness in historical context. The second finding was that architectural design tools of proportion, shape, and scale, were identified to be very influential in dealing with the idea of compatible design in historic context.

## 6. Conclusion

The aim of this research was to establish guidelines in dealing with new architectural intervention in urban historical setting to achieve aesthetic fitness. It was inspired by several relevant issues that are still critical in the development of such urban environment. It concerns with aesthetic fitness of new building in historical context. Significance aspects of formal aesthetic were clarified to be compatibility, meanings and visual harmony, and also several design tools of proportion, shape and scale. Although, this research is ongoing research and has not yet been completed, the limited findings already suggested that certain physical aspects affect the interpretation of fitness of architectural intervention in historical context. These are very important findings as they give better understanding in formulating the frameworks toward establishing the guidelines for architectural intervention in such urban environment.

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