Preferential Strategies in Designing Historical Textures' Infill Buildings from the Perspective of the Architecture, Urban Engineering, Restoration and Repair Experts[*]

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ABSTRACT

The historical core of the cities are recognized as the cultural and social heritage of every society but the depreciation and destruction resulting from the passage of time and the gradual elimination and/or change of performance in some of the buildings in the historical context posit the need for intra-contextual development and designing of the infill buildings. If carried out in an unbalanced manner, without paying attention to the backgrounds and in a hasty pace, these developments would lead to inconsistency and disorder in the old texture. Steven Semes, a university professor and architecture and designer of the various conservational and building projects in the US, introduces four prominent solutions for the designer upon confrontation with the historical backgrounds. They are literal replication of the context, invention within style, abstract reference and intentional opposition to the background. The present study aimed at the investigation of the preferential strategy of the urban engineering and restoration experts for designing infill buildings in historical context based on the four solutions posited by Semes. The recognition of the experts' preferential perspectives and comparison of them with the citizens' perspectives and discovery of the similarities and differences between the perspectives of these two groups can guide the experts in the designing of the future infills. Use has been made herein of survey research method that is implemented in two stages. Moreover, the information has been collected based on two methods, namely documentary research and field observation (questionnaire). The study population of the present study was comprised of 120 experts from the three abovementioned fields of study. The obtained results were indicative of the idea that the architects chose intentional opposition to the context and the urban engineers and restoration specialists selected the literal replication of the context as their preferential strategy for the designing of the infill buildings in the historical context. Furthermore, the most important feature of the designing, as viewed by the architectural experts, was the creation of innovation and complexity in the context; urban engineering and restoration specialists found pleasantness in context as the most significant designing property.

Keywords: Infill Buildings, Historical Context, Steven Semes, Experts' Preferential Strategy.

1. INTRODUCTION

The development and growth of the historical context and designing in such contexts entails the sensitivity of the urban designers, architects and specialists; the construction of the new buildings in historical grounds is a complicated issue because such buildings should induce and express the contemporary spirits for the reason that they are new structures inside the historical texture and, in the meantime, their designing works should take into account the historical background in the context of which they are situated. Negligence of the past history of the cities and their historical trends of formation and historical development in the fast reconstructions in the aftermath of WWII and their harmful results in the architecture and urban engineering instigated some thinkers to consider issues related to designing in the existent backgrounds in such a way that the issue gradually found its way into the global meetings and conferences. In the continuation of this attitude, some theoreticians opened the doors into discussions regarding this issue in 1960s and 1970s, but it was in 1980s that the contextualism was posited in western architecture. The publication of the book "architecture in context"[1] in 1980 is amongst the results of such a movement that deals with the way of treating designing context in architecture. In 1983, in Roma, a common meeting was held by ICROM and ICOMOS and the obtained results were published in 1993 in the form of guidelines for cultural heritage areas.

In a part of the ninth section of the book, "management guidelines for the cultural heritage areas"[2], the results of about ten years of cooperation between the conservation experts and global heritage managers from various countries have been exposed to the use by the general public. In this book, the term "infill building" was for the first time used for referring to the presence of new structures in the historical backgrounds and their characteristics (Shah Teymouri & Mazaherian, 2012, p. 30).

Infill development or expansion from inside is, in fact, a sort of progression that takes place unlike the other policies of urban development in the existing grounds of the city and with presence of the citizens and neighboring units. In the internal development, the old textures and historical and, occasionally, ineffective cores of the cities are revived and improved and renovated in lieu of the cities' horizontal expansion (Rafieian, Barati, & Aram, 2010, p. 48).

In other words, the infill urban development is the expansion of the segments that have been away in the urban development period from the process of development hence, it was found mostly underdeveloped (Falconer & Frank, 1990, p. 137). It can be also stated in defining the infill buildings that the infill structures are new constructions on historical backgrounds that try empowering a region's identity instead of competing with it. These structures are made coordinated and consistent with the peripheral buildings and prevent the severe disintegration from occurrence. This does not deny the differences between the buildings but confirm the existence of differences in line with more liveliness (Pakzad, 2010, p. 465).

The present study has dealt with the investigation of the preferential strategy of the architects and experts of restoration and urban engineering for designing infill buildings based on the four solutions proposed by Semes ranging between two spans of opposition to the context and consistency to the context. The recognition of the preferential solution for the designing of the infill buildings from the perspective of these experts as the main constructors of the urban contexts and comparison of them with the citizens' perspectives can lead to an answer to the question as to why the infill developments have failed in the majority of the country's historical cores. It can be also assumed that the architects are mostly inclined towards the opposition and incompatibility with the context (the solution "intentional opposition to the context) and the urban engineering and restoration experts are more inclined towards consistency and conformance to the context (literal replication of the context). It can be also predicted that the most important attribute of this designing style from the perspective of the architectural experts is the creation of innovation in the contexts whereas the most significant feature of this designing style from the perspective of the urban engineering and restoration specialists is the pleasantness and favorability of and coherence with the context.

2. BACKGROUND OF THE STUDY

Amongst the new studies that have been conducted about the infill structures, the research by Hesam Al-Din Sotudeh et al. can be pointed out that was carried out in UTM University in Malaysia. In one of his articles named "successful designing of infills in the historical context", he has dealt with the investigation of the influential parameters such as form, constructional materials, decorations and so forth (Sotudeh & Vanmohdzakeri, 2012, pp. 7-12).

In another article called "evaluation of the designing proportions in the historical urban textures from the perspectives of the residents", he evaluated the solutions of designing infill buildings from the viewpoints of the residents (Sotudeh & Vanmohdzakeri, 2013, pp. 85-93). The present study has made use of the study method applied in the foresaid article.

Amongst the studies conducted in Iran, the work by Mojtaba Rafi'eiyan et al. under the title of "assessing the capacity of the abandoned spaces' development in downtown Qazvin" can be pointed out, which is a research in the area of urban engineering that deals with the feasibility of infill development in one of the streets in Qazvin (Rafi'eiyan, Barati, & Aram, 2010, pp. 45-61).

In another article entitled "the effects of infill

structures on the provocation of renewals in the worn-out textures", the writer introduced the infill structures as the primary incentive of development (Khademi & Alipour, 2011, pp. 80-83).

There are works done in the area of repair and restoration through the construction of infill buildings amongst which the book "new structures in the historical environments" can be pointed out in which the author introduces and classifies methods that are usually chosen by the architects for the construction in the historical context (Ghadiri, 2007). Also, reference can be made to an article named "designing guidelines for the new structures in historical backgrounds" (Shah Teymouri & Mazaherian, 2012, pp. 29-40) and the article called "infill buildings as the intermediaries of the presence of modern structures in the historical context" (Farahzad, 2011, pp. 1-11).

3. THEORETICAL FOUNDATIONS

There are formed various attitudes towards the designing and construction of the infill buildings in the historical context. A relatively vast array of viewpoints can be found from modernism's indifference to the historical backgrounds to the pure imitation and sampling. In a book called "historical conservation", Tylor has introduced three solutions in the face of the historical backgrounds, namely adjustment to and repetition of the context, creation of consistency and coordination with the context and new-old incompatibility (Tylor, 2006).

In a book named "designing in historical areas", Davis has put forth a continuum; one end of which is incompatibility and the other end is consistency and stated that any sort of reaction that is exhibited by a designer towards the background and the subsequent solution, can be classified according to closeness or distantness to any of these two ends of the spectrum. He took five different approaches to the infill designing into consideration, including imitative approach, traditional approach, precise approach, modern approach and rogue approach (Davis, 2003).

The theory used in the current research paper as the theoretical foundation was the perspective proposed by Steven Semes. Meanwhile accepting Davis and Tylor's theories, Semes posited four outstanding solutions for the designers, namely literal replication of the context, invention within style, abstract reference and intentional opposition (Semes, 2006, pp. 163-178).

A. Literal Replication of the context: This strategy gives superiority to the consistency with the background and tries reducing the difference to a minimum.

B. Invention within style: This strategy does not exactly repeat the main plan but adds new elements to the main plan or to a design close thereto, hence it is somehow a continuation of the background architecture's language. The goal of this approach is reaching a balance between incompatibility and consistency.

C. Abstract reference: The third strategy is the reference to the historical buildings existent in the context while preventing the exact similarities and or using historical forms and styles. This approach advances towards a balance between incompatibility and consistency, but it is more frequently inclined towards the former instead of the latter.

D. Intentional opposition: This strategy is a sort of conscious opposition and disagreement with the context with the objective of acquiring a distinct personality through opposing the context.

3.1. Cognitive Properties for the Evaluation of the Environment's Aesthetical Quality

The visual quality of a city is not the result of a single building rather it is the product of a conscious urban design and the concerns about the aesthetical quality of designing in the historical urban environment is not irrational because the aesthetical aspects of the environment are amongst the most primary factors in the analysis of the environment's psychological effects on the individuals (Reis & Dias Lay, 2010, p. 42).

There are various perspectives regarding the perception and evaluation of the environment designing quality that most of them are laid on the foundation of the aesthetical preferences. The scales of this study, as well, have been provided based on the work by Gifford and include six evaluative cognitive characteristics: decision-making and sociability, coherence (as opposed to confusion and ambiguity), sensible and symbolic (as opposed to meaningless and non-symbolic), innovative and creative (as opposed to non-creative), complexity (as opposed to simplicity) and pleasantness and agreeability (Gifford & Hine, 2002, pp. 131-154).

Meanwhile identifying the designing strategies with high priorities from the perspective of the experts, the present study investigated the relationship between these selected strategies and the six abovementioned characteristics.

4. METHODOLOGY

The present study was carried out in a survey manner and took Semes's classifications as a scale to investigate the preferential strategies of the architecture, urban engineering and restoration experts for the designing of the historical context.

In the first stage of the study, 96 building views from Iran and other spots worldwide were seminally selected and 12 architectural specialists were asked to classify the images (Fig. 1) based on the four solutions posited by Semes. The images could take a position anywhere on a continuous diagram with consistency (conformance to the context) as one of its extreme ends and incompatibility as the other extreme.
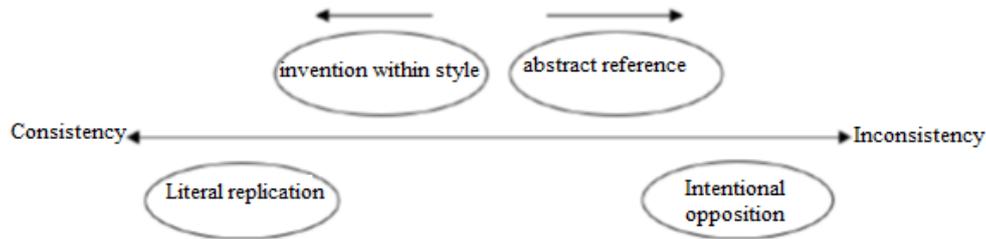
Fig. 1. Obtained Four Solutions for Designing Infill Buildings on a Diagram from Consistency to Inconsistency

In the next stage, 12 buildings have been selected from the 96-item reservoirs for the questionnaire meaning that three buildings from Iranian texture and 9 buildings from the other parts of the world have been chosen for each designing strategy. Then, 120 experts in architecture, urban engineering and restoration have been asked to give a score to the following cognitive properties in regard of the images belonging to each group of the designing strategies: coherent building with context, meaningful building with context, pleasant building with context, complex building with context, friendly building with context and novel building with context.

The questionnaire has been designed in Likert's scale and included five items (very low, low, intermediate, high and very high). Next, each of the items was numerically evaluated in a range from one to five. The numerical sum of these values gave a score for every scale that indicated the respondents' tendencies. The experts' preferred strategy could be identified through comparing these scores with one another for the infill buildings and subsequently the cognitive property influencing the preference was introduced.

5. FINDINGS

In total, 120 respondents participated in the study, including 40 experts from each of the architecture, urban engineering and restoration fields. Table (1) is expressive of the number of the respondents, gender and education level of them. The majority of the respondents had MA degrees.

Table 1. Number of the Respondents, their Genders and Education Levels

Number of respondents	Gender		Education level		
120	Female	Male	B.A.	M.A.	Ph.D.
	71	58	56	60	4

5.1. Preferential Strategy of the Infill Buildings from the Perspective of the Architectural, Urban Engineering and Restoration Experts

As it had been predicted, the architectural experts chose the intentional opposition with the context as the most preferred strategy for the infill buildings and gave the highest score thereto; literal replication was given the lowest score by these experts (Table 2). In fact, as it is observed in chart 1, the more distance was taken away from the consistency with context towards inconsistency with context, then, the more the architectural experts' inclinations were also increased.

Table 2. The Inclination Rates of the Architectural, Urban Engineering and Restoration Experts towards each of the Four Infill Building Designing Strategies

	Literal Replication	Invention Within Style	Abstract Reference	Intentional Opposition to Context
Architecture	119	132	137	159
Urban Engineering	150	122	118	105
Restoration	139	101	129	131

Completely contrarily, urban engineering experts gave the highest score to the literal replication and it was found out that the more the designing strategies got closer towards opposition with the context, the more the inclinations of the experts of this field were reduced towards it (Chart 1). The experts of restoration, as well, chose literal replication of the context as their most preferred strategy and intentional opposition to the context was ranked second from the perspectives of these specialists (Chart 1).
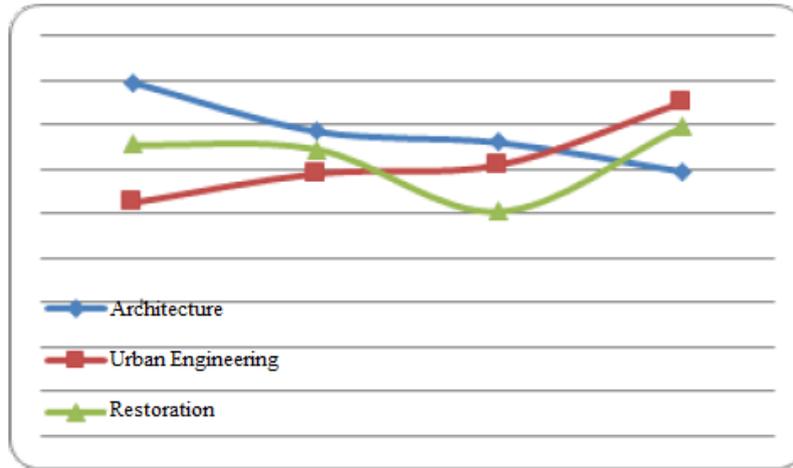
Chart 1. The Preferred Strategy for the Infill Buildings from the Perspectives of the Architectural, Urban Engineering and Restoration Experts

5.2. Cognitive Properties Influencing the Selection of Designing Strategy from the Perspectives of the Experts

To figure out the factors causing the experts of each field choose a strategy as their preferred method and give it a higher score, the specialists were asked to give a value in regard of every solution to the six cognitive properties that have been posited for the evaluation of the aesthetics of the new buildings in the historical background by Gifford. So, the cognitive attribute that acquired the highest score amongst the preferred strategy of each group of the experts, was recognized as

the attribute influencing the selection of the designing strategy from the perspective of the experts of the field. According to chart 1, the architectural experts' preferred strategy was intentional opposition to the context and the cognitive attributes that have been given the highest score in relation to the intentional opposition to the context by the experts of this field were invention within style and complexity in context; both of which were recognized amongst the primary characteristics influencing the preferred strategy of infill buildings' designing from the perspective of the architectural experts (Table 3).

Table 3. Evaluation of the Six Cognitive Properties in each of the Four Designing Strategies of the Infill Buildings from the Perspectives of the Architectural Specialists

	Literal Replication	Creative Intervention in Style	Abstract Reference	Intentional Opposition
Coherence with Context	122	99	118	114
Meaningfulness with Context	122	108	134	138
Pleasantness in Context	129	128	132	143
Complexity in Context	103	113	140	165
Friendly with Context	114	108	119	122
Invention within Context	100	127	151	165

The experts of urban engineering chose the literal replication of the context as their preferred strategy (Chart 1) and the highest scores, 143 and 141, were respectively given to pleasantness and coherence in regard of the literal replication of the context.

Resultantly, the pleasantness and agreeability in context followed by coherence with context were selected as two primary characteristics influencing the selection of a designing strategy from the perspective of the urban engineering experts (Table 4).

Table 4. Evaluation of the Six Cognitive Properties in each of the Four Infill Buildings' Designing Strategies from the Perspective of the Urban Engineering Experts

	Literal Replication of the Context	Creative Intervention in Style	Abstract Reference	Intentional Opposition
Coherence with Context	141	108	111	93
Meaningfulness in Context	128	116	112	107

Pleasantness and Agreeability	143	124	119	106
Complexity in Context	111	119	124	131
Friendly Relationship with Context	133	109	111	110
Invention in Context	125	134	127	129

The preferred strategy of restoration experts, as well, was literal replication of the context (Chart 1) and the cognitive attribute that has acquired the highest score from the restoration experts was pleasantness and agreeability in context. Resultantly, the pleasantness and agreeability in context was the most primary factor in selecting the proper designing strategy for the construction of the infills as concomitantly viewed by the restoration and urban engineering experts (Table 5).

Table 5. Evaluation of the Six Cognitive Properties in each of the Four Infill Buildings' Designing Strategies from the Perspective of the Restoration Engineering Experts

	Literal Replication of the Context	Creative Intervention in Style	Abstract Reference	Intentional Opposition
Coherence with Context	122	89	114	118
Meaningfulness in Context	128	93	123	134
Pleasantness and Agreeability	140	101	122	133
Complexity in Context	105	109	134	138
Friendly Relationship with Context	124	95	109	122
Invention in Context	118	124	145	150

6. ANALYSIS OF THE FINDINGS

According to the present study's findings, architectural specialists chose intentional opposition to the context as the most preferred designing strategy for the infills; the more the designing strategies moved towards contextualism and consistency with context, then, the more the inclinations of these experts were reduced thereto. This perspective of the architects was not only at odd based on the present study's findings with the urban engineering and restoration experts. But also was inconsistent with the general public's attitudes.

The people generally prefer the infill buildings to have the highest replication of their peripheral buildings (Elish, 1994, pp. 63-75) and believe that the harmony and aesthetical proportion of the new buildings with the historical background can be only achieved by such a strategy as literal replication of the context (Groat, 1992, pp. 160-161).

Also, in the article that was conducted by Sotudeh et al, the infill buildings' designing strategies were investigated from the perspective of the residents and the present study has taken advantage of the foresaid study's research method. The literal replication of the context was given the highest score in that research and the people gave the lowest score to the intentional opposition to context that was found in the current research paper as the strategy chosen by the architectural specialists. Such a severe conflict between the architects' attitudes and others, especially the general public's, is not favorable and can lead to the lowering of the people's satisfaction of the quality of the urban spaces because the architects are the primary designers of the urban contexts.

7. CONCLUSION

The growth and development in the historical backgrounds necessitates sensitivity in the urban designers and specialists. The development of infills or the development from inside in lieu of the horizontal expansion of the cities would revive and reconstruct the old and inefficient urban cores and the parts that have stayed away from the development process in the course of the urban development. There are formed various perspectives towards the designing and construction of the infill buildings amongst which the notions by Steven Semes can be pointed out. He placed every reaction exhibited by a designer in the face of historical grounds on a continuous diagram, one end of which is consistency with the context and the other one is inconsistency with the context. Then, he classified the diagram into four parts and put forth four designing strategies literal replication, creative intervention in style, abstract reference and intentional opposition to the context. This article has dealt with the preferred strategy of designing infills from the perspective of the architectural, urban engineering and restoration specialists; the architects identified intentional opposition with the context as their most preferred strategy and the more the strategies moved towards consistency with context, then, the more the architects' attitudes towards it were reduced. Quite contrarily, the literal replication of the context was given the highest score by the urban engineers and the intentional opposition was the strategy that received the lowest score. The restoration experts, as well, chose literal replication as their preferred strategy and the intentional opposition to the context was ranked

second by the experts of this field.

According to the present study's findings, two primary properties for the designing of the infill buildings from the perspective of the architectural experts was the creation of innovation and complexity in context whereas the urban engineers and restoration specialists gave the highest score to the pleasantness and agreeability of the context and the coherence with context was ranked second with a trivial difference from the perspective of the urban engineering experts.

According to the results of the studies that have been so far conducted regarding the infill buildings, the majority of the people preferred to have infill buildings with the highest rate of the replication of the peripheral buildings and this was in conflict with the architects' attitudes towards the infill buildings and it can be followed by unfavorable outcomes like reduction in the people's satisfaction and participation in the urban spaces, hence it is in need of a large deal of attention by the experts and architects.

END NOTE

1. Brolin & Brent C. (1980). "architecture in context; contextual architectural designing: consistency of the new buildings with the old structures", tr. Raziyeh Rezazadeh, 2004, Isfahan: Khak.
2. Filden, Bernard, & Bokilino Yoka. (1998). "management guidelines for the global heritage areas", tr. Piruz Hanachi, 2004, Tehran: Tehran University Publication and Printing Institution.

REFERENCES

- Davis, M. (2003). *Design in the Historic Environment*. Building Conservation.

- Elish, A.M. (1994). *Contextualism in Architecture: a Comprative Study of Environmental Perception*. The University of Michigan, 63-75.

- Falconer, M., & Frank, J. (1990). Sufficiency of Infrastructure Capacity for Infill Development. *Journal of Urban Planning and Development*, 116(3).

- Farahza, N. (2011). Infill Buildings Facilitate the Presence of New Structures in Old Texture. *Second International Conference on Architecture & Structure*, Faculty of Fine Arts, Tehran University, Iran.

- Ghadiri, B. (2007). *New Structures in Historical Environments*. Tehran: Office of Cultural Studies.

- Gifford, R., & Hine, D.W. (2002). Why Architects and Layperson Judge Building Differently: Cognitive Properties and Physical Base. *Journal of Architecture and Planning Resaerch*, 19(2), 131-154.

- Groat, L.N. (1992). *A Study of Perception of Contextual Fit in Architecture*. In: DousAmedeo et al. (Eds.), Procedings of the 14th Annual Environmental Design Research Association and Practice, EDRA, University of Nebraska- Lincolnpp. 160-161.

- Khademi, M., & Alipour, R. (2011). Infill Structures Influence on Stimulating of Development in Worn-out Urban Tissues. *Journal of Landscape*, 14, 80- 83.

- Pakzad, J. (2010). *An Intellectual History of Urbanism*. Tehran: Armanshahr.

- Rafieian, M., Barati, N., & Aram, M. (2010). Measuring Developing Capacity of Unused Spaces in Qazvins City Center, with Emphasising on Infill Buildings Development.Approach. *Scientific Journal of Honar University*, 5, 45- 61.

- Reis, L., & Dias Lay, M.C. (2010). *Internal and External Aesthetic of Housing Estates*. Environmental and Behavior, SAGE Publication, 42.

- Semes, W. (2009). *The Future of the Past: A Conservation Ethic for Architecture*. Urbonism, and Historic Preservervation. Available at WWW.North Company. 21/05/2015, 163-178.

- Shah Teymouri, Y., & Mazaherian, H. (2012). Design Guidelines for New Constructions in Historic Context. *Journal of HONAR-HA-YE- ZIBA- MEMARI -VA- SHAHRSAZI*, 17(4), 29-40.

- Sotoude, H., & Wan Mohd Zakri, W.A. (2013). Evaluation of Fitness of Design in Urban Historical Context: From the Perspective of Residents. *Frontiers of Architectural Research*, 2, 85- 93.

- Sotoude, H., & Wan Mond Zakri, W.A. (2012). Affected Variables on Successful in Fill Design in Urban Historic Context. *Arts and Design Studies*, 3, 7-12.

- Tylor, N. (2006). *Historic Preservation: a Introduction to Its History. Principles and Practice*. 3rd Edition. Available at WWW.Norton, Co. 21/05/2015.