



## Affecting factors on user satisfaction of public drinking water fountain usage (Case: courtyard of the holy shrine of Imam Reza<sup>AS</sup>)

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### Abstract

The Holy Shrine of Imam Reza<sup>AS</sup> is one of the most important places in Iran in terms of religious and public beliefs. Huge volumes of pilgrims travel to the mentioned place, so the appropriated environmental and furniture design to increase the visitors' satisfaction is inevitable. In this regards, the main objective of this study is to identify an appropriated design for public water taps through the assessment of affecting factors in terms of the pilgrims' satisfaction. Methods: In this survey, 400 volunteer pilgrims participated in our 5-scale Likert questionnaire. The gathered data were analysed by SPSSWin21 and Spearman test. Results: This study shows that there is a significant association between user satisfaction and public water taps' function ( $p = 0.00$ ), however the participants were more satisfied with the technical aspects than the aesthetic ones. The users were not satisfied with the placing of water taps, pressure of water's valve and local illumination in night time. Conclusion: This study confirms the importance of design considerations, construction and materials, location of public water fountains in the assessed courtyard of the Holy Shrine of Imam Reza<sup>AS</sup> to satisfy the pilgrims. Considering with Islamic architectural elements, appropriated form and style, color and material, perfect harmony affect on users. The modification of water fountain place in terms of dimension and local illumination are also important.

**Keywords:** Drinking water fountain, Satisfaction, Function, Aesthetics, Holy shrine of Imam Reza<sup>AS</sup>.

### 1. Introduction

Measurement of user satisfaction might be known as an effective way to assess the consumers' requirements and needs, which would assist the designers in figuring out the shortcomings of their products [1].

There are only some limited researches in assessing the satisfaction among the pilgrims of the Holy Shrine of Imam Reza<sup>AS</sup>. Therefore, about drinking water fountain in this study, the most related factors were considered in order to prepare a better design for drinking water fountains.

### 2. Literature Review

#### 2.1. Satisfaction

According to Richard Oliver (1981), user satisfaction is related to the difference(s) between user's needs and product quality [2]. Satisfaction is a strategic key in marketing and is known as a prominent factor in economic and marketing competition [3].

There are some definitions about satisfaction in which some common variables are highlighted as follows [4]:

a- User satisfaction is an emotional and cognitive response;

b- Responses are related to user's expectancies and experiences;

c- User's response is associated to a particular time.

User satisfaction is a subjective state in which demands, expectations and needs will be resolved during the product usage and this process makes a loyal customer [5].

ISO 9241-11 emphasizes on the integration between user satisfaction, efficiency and effectiveness to introduce a qualified product [6], and ISO/IECCD 25010.3 states satisfaction is related to usability and user's comfort during product usage. In this regards user satisfaction

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includes functionality and pleasure [7]. User surveys can explore whether there is a gap between the user's expectation and actual experience of public equipment, and also the reasons for any gap [8]. Thus, a feeling of satisfaction or dissatisfaction with products can make a good or bad experience for pilgrims during their stay in the shrine complex.

## 2.2. Functionality

In the early twentieth century, consumer products were primarily designed to provide functionality. Later, the form and appearance began to be emphasized [9]. Today, design has become a process in which the product form and its function are created simultaneously. By functionality, we refer to the opportunity for action that is afforded by a product [10]. Generally, most people categorize all things into two groups of functional and non-functional. In some issues, these groups are explained but there is no clear boundary between them. Function is a term which refers to artefacts' performance and usage according to Crilly (2010) "People use artefacts, whilst artefacts perform function" [11].

Functionality, designed into the product, implies that the product is able to perform the desired functions without posing excessive demands on the user at any given time [12]. In some cases function might be divided in technical and social function, and some of the authors pointed to two main categories i.e., technical and non-technical. In this regards some functions such as aesthetics and ergonomics are defined as sub group of technical functions. Another classification refers to purpose and effects [11].

In this study, the authors divided function to technical and aesthetics, based on Crilly (2010).

## 3. Street Furniture

One of the most important elements in urban areas is street furniture, which actually constitutes a substantial part of urban identity [13]. Street furniture has a firm association with citizens, and some factors are prominent in their design and installation in this regards, such as quality, quantity, comfortability, aesthetics, site selection, stability and resistance [14]. The mentioned characteristics are important not only in terms of people's satisfaction, but also in urban landscape and beautification. Besides, street furniture is used by a vast range of users from children to elderly and disabled people, so attention to the quality of design seems very important [14].

### 3.1. Drinking water fountain

One significant element in urban environments is the drinking water fountain. In the design of water fountains, some features should be considered in terms of health factors and also users' considerations [15]. Undoubtedly, these urban element designs should have some appropriated harmony with other street furniture or environment. The benefits of this combination are varied such as health considerations, user satisfaction, and economic considerations in terms of installation, visual features, etc. [16].

### 3.2. Types of drinking water fountains

The drinking water fountains might be categorized in terms of form, material and mechanism. The form covers some sorts of products, such as single/double and three-sided, tetragonal and special ones. The material includes some different structure, including stone, metal, cement, concrete, brick, fiberglass, and mixed ones. The tap mechanism divides into three types, namely manual, foot lever, and photoelectric sensors. Besides, there are drinking water fountains with or without cooling system.

### 3.3. Factors affecting the functioning drinker

Some factors are important to have an appropriated drinker and good quality in terms of function and also user satisfaction, which are as follows:

- Design and construction considerations;
- Material;
- Installation and proper location;
- Maintenance and repairs; and
- Form and aesthetics.

## 4. The Holy Shrine of Imam Reza<sup>AS</sup>

Every year, a large number of people from different places in Iran or overseas visit this city, and therefore visitors' and pilgrims' needs should be managed by the related authorized organization in terms of people satisfaction, health, safety and security and so on. Mashhad climatic conditions vary in seasons from mild to dry and cold [17]. The Holy Shrine of Imam Reza is known as the most important place in this city. The huge number of people comes to this place in different times, especially during the pray time and also some events in this place are attended by a lot of pilgrims.

There are some different places in the Holy Shrine of Imam Reza<sup>AS</sup> (Fig. 1), where the distribution of population in ordinary days and religion events vary (Fig. 2 & 3).

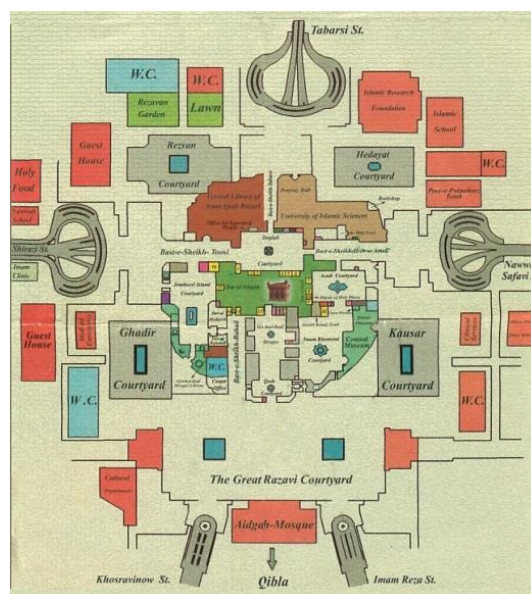
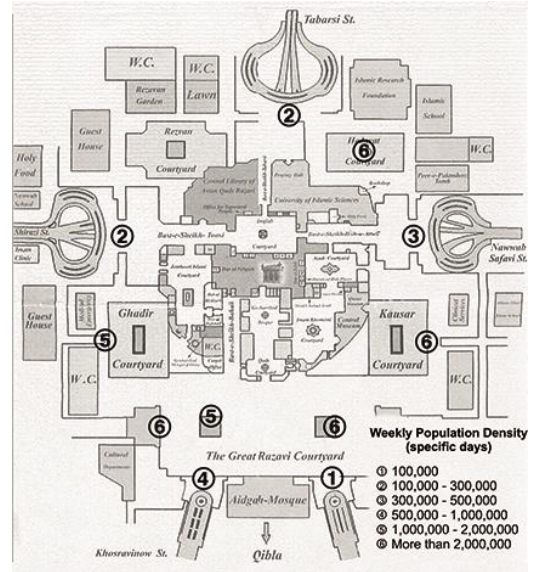
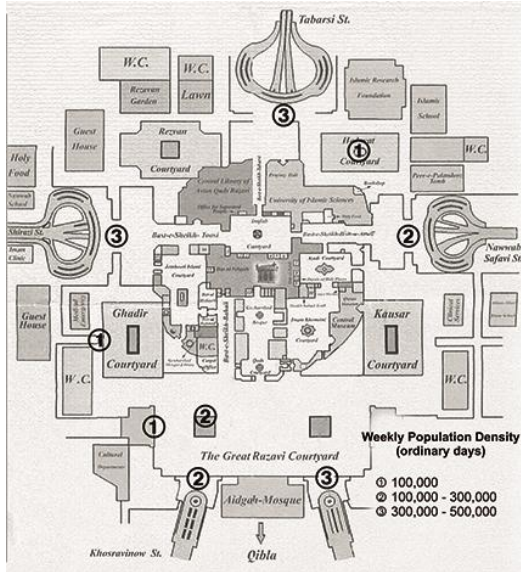


Fig. 1. Different places in the shrine complex [18]



**Figs. 2 & 3.** The population rate in ordinary days (left) and religious events (right) [19]

### 5. Drinking Water Fountains in the Holy Shrine of Imam Reza<sup>AS</sup>

There are different sorts of drinkers in the shrine of Imam Reza such as pedestal fountain, traditional Iranian drinking water fountain (Sagakhaaneh) and multi-faceted fountain (Fig. 4 to 9), in which the valves are placed around the fountains or in a line. There are some mobile water tanks in the related places which were not included by our case study.



**Fig. 4.** Water fountain in Enghelab Courtyard [20]



**Fig. 5.** Water fountain in Guds Courtyard [20]



**Fig. 6.** Water fountain in Jomhoori Islami Courtyard [20]



**Fig. 7.** Stone tetragonal fountain in Azadi, Jaame, Kausar and Hedayat Courtyards [20]



Fig. 8. Water fountain with a composite roof in Rezvan Courtyard [20]



Fig. 9. Water fountain in Ghadir Courtyard [20]

## 6. Materials and Methods

In this survey, some questionnaires followed by interviews and also in-depth observations were used for data gathering. For validation of questionnaires, five industrial design specialists, as well as 40 volunteers among chosen from pilgrims participated in carrying out the process of research. Kronbach coefficient was calculated (0.948) by SPSSWin21. According to sample size formula and a confidence level (0.95), at least 384 samples should be gathered; however, it was done by 400 ones. An integrated sampling method was used for this survey, which was started by quota and then volunteer.

## 8. Conclusion

According to our findings and statistical analyses, the modification of fountain drinkers is necessary as there is a relationship between satisfaction and technical

All process of data analysis was done by SPSSWin.

## 7. Results

According to the demographic data (Tab. 1) and data analysis, about 95.5% of people used the public water fountains and the rest of the participants stated some problems. Among the latter group of people, 22.5% of them painted on slippery surface close to fountain, 16.7% complained about crowded lines waiting for water drinking, and 11.2% weren't satisfied in terms of health aspects.

Table 1 Respondents' demographic data

|                          | Man                  | Woman  | Total  |
|--------------------------|----------------------|--------|--------|
| Number                   | 169                  | 231    | 400    |
| Sex                      | % 57.7               | % 42.3 | 100    |
| Age                      | Over 40 years        |        | % 34.5 |
|                          | 25 to 40 years       |        | % 36.8 |
|                          | 18 to 24 years       |        | % 24   |
|                          | 10 to 17 years       |        | % 3.2  |
|                          | Below 10 years       |        | % 1.5  |
| Education                | Masters and over     |        | % 6    |
|                          | Bachelors            |        | % 42   |
|                          | Associates           |        | % 10.8 |
|                          | High School Graduate |        | % 31.5 |
|                          | Under High School    |        | % 9.8  |
| Resident in Mashhad      |                      |        | % 13   |
| Resident in another city |                      |        | % 87   |

The main hypotheses of this study are as follows:

There is an association between pilgrims' satisfaction and water fountains;

There is a significant relationship between fountains' aesthetics and pilgrims' satisfaction; and

Fountains associate with user satisfaction in terms of functionality.

The hypothesis test by Spearman test shows that there is an association between people's satisfaction and the three factors of fountain drinkers' function (including technical and practical functions), and aesthetics ( $p < 0.05$ ).

There are some items in both mentioned factors in which there are some differences between people's satisfaction factors (Table 2).

Table 2 Pilgrims' satisfaction (technical & aesthetical function)

| Indicators         | Mean  | Satisfaction Mean<br>(cl.=0.95) |            | S.D.   | Min.  | Max. |
|--------------------|-------|---------------------------------|------------|--------|-------|------|
|                    |       | Min. Conf.                      | Max. Conf. |        |       |      |
|                    |       | Technical function              | .5773      |        |       |      |
| Aesthetic function | .3300 | .2918                           | .3682      | .38840 | -1.25 | 1.50 |

functionality. Besides, some related considerations should be dedicated in terms of feature design, material, installation and maintenance. Aesthetics is another main factor for having appropriated fountain drinkers. The results show that the person's satisfaction with technical

characteristics is more than aesthetic ones; however, control lever for water pressure should also be regulated. Undoubtedly, sanitation and health consideration are prominent factors. Also, adequate space for glasses and their holders should be modified to provide better access.

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