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Assessment of user preferences of campus green space at Ferdowsi University of Mashhad-Iran

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ABSTRACT

Researchers have found that a user's perception of the campus environment is related to quality life and academic accomplishment. In this study, we have analyzed the perceptions of more than 600 users at the Ferdowsi University of Mashhad to evaluate the level of green space use and to understand user preferences from aesthetics and safety aspects. The results show that for most of the respondents (more than 80%), the use of green space was nearly 40%. The respondents' aesthetics and safety preferences were more than moderate (65%) and nearly high (70%) respectively. A high correlation (nearly 80%) was found between their aesthetics and safety preferences. Based on the results, we recommend a thorough investigation of the effective factors and exploration of the reasons for the reduced campus green space use.

Keywords: Aesthetics, green space use, safety, student.

ارزیابی ترجیحات کاربران فضای سبز محوطه دانشگاه فردوسی مشهد-ایران

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چکیده

محققان دریافته‌اند که ادراک کاربران از محوطه‌های دانشگاهی با کیفیت زندگی و موفقیت تحصیلی در ارتباط است. در این مطالعه، برداشت و ادراک بیش از ۶۰۰ نفر از کاربران دانشگاه فردوسی مشهد به منظور ارزیابی سطح استفاده از فضای سبز و ترجیحات کاربران از جنبه‌های زیباشناسی و امنیتی آنالیز شدند. نتایج نشان داد که در اکثریت پاسخ‌دهندگان (بیش از ۸۰٪)، میزان استفاده از فضای سبز تقریباً ۴۰٪ بود. ترجیح زیباشناسی و امنیتی پاسخ‌دهندگان به ترتیب بیش از حد متوسط (۶۵٪) و تقریباً بالا (۷۰٪) بود. بین ترجیح زیباشناسی و ترجیح امنیتی همبستگی بالا (تقریباً ۸۰٪) توسط پاسخ‌دهندگان پیدا شد. بر اساس این نتایج، ما بررسی کامل عوامل و دلایل مؤثر بر کاهش میزان استفاده از فضای سبز این محوطه دانشگاهی را توصیه می‌کنیم.

واژه‌های کلیدی: استفاده از فضای سبز، امنیت، دانشجو، زیباشناسی.

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Introduction

Green space is a significant component of the campus design that adds value to the campus experience aesthetically, educationally, and environmentally. It includes landscaped natural areas composed of trees and vegetation. Therefore, effective management is essential to maintain the visual appeal and biodiversity of these spaces. Green spaces help to keep cities cool; they act as natural filters and noise absorbers; they improve micro-climates and protect and improve the quality of natural resources including soil, water, vegetation, and wildlife. Trees contribute significantly to the aesthetics appeal of cities and thus help to maintain the psychological health of citizens (Kuchelmeister and Braatz, 1993). Some studies show that most university students feel stress due to the pressure of various exams, academic courses, college life, and financial issues (Robotham, 2008); they experience emotional problems pertaining to relationships and also with other students and faculty members (Hurst *et al*., 2013).

Vegetation contributes positively to increase the quality of life, especially in educational areas. The presence of urban trees and forests can make the environment a more pleasant place to live, work, and spend leisure time (Dwyer *et al*., 1992). Lewis (1994) explained that interactions with natural areas positively affect individuals both mentally and physically. Im (1984) reported that vegetation is one of the three important predictors for the visual preference of a familiar campus area for students. Doxey (2008) found that the presence of interior plants in a classroom leads to increased student interest in their subjects, increased student satisfaction with the course and instructor, and higher course grades. In another study, McFarland *et al*. (2008) surveyed some undergraduate students at a university in Texas, where they explored the use of nature and quality of university life. The students were asked to rate the extent to which they participate in various outdoor activities on the campus. Most students were considered high-users of campus green spaces, and, of them, most considered their overall quality of university life to be positive. Studies have found that direct exposure to the nature, viewing the nature through windows, and viewing images of the nature are restorative (Felsten, 2009). Studies have shown that green space reduces the fear of illegal and undesirable activities, thereby enhancing the sense of safety (Hami *et al*., 2014). The moderation roles of plants in the reduction of aggression and violent behavior help to augment self-control and reduce criminal activity (Jieun, 2005).

The aims of this study were to investigate and evaluate (1) the level of green space used by students and staff and (2) the aesthetics and safety preferences of users on the Ferdowsi University campus.

Methods

Study Area

The area of this study is the Ferdowsi University campus, which is situated south of Mashhad City, Iran. With an area of 330 ha, the Ferdowsi University is the largest university in northeastern Iran. The number of student and teaching staff in this university are nearly 20,000 and 2,000 respectively. Ferdowsi University has 12 faculties, four research centers, and many office buildings. This university was founded in 1961, and it has a fairly big campus with rich vegetation (high variety in plant species) (Fig. 1).

Figure 1. Part of campus green space at Ferdowsi University of Mashhad, Central Building

Questionnaire Structure

For the purpose of this study, a two-part questionnaire was developed. The first part of the survey included questions about socio-demographics (age, gender, education level, user types and place of work). The second part included questions about the usage level of campus green space, aesthetics and safety preference, and also the relevance of the planting design in each faculty or center with the title of that faculty or center. For instance, this study investigated how agricultural faculty subjects affected its special planting design.

This survey was carried out online through the Information Technology Services (ITS) Center of Ferdowsi University. The total sample of the survey was n=600, of which not all questionnaires were fully completed. The response was about 98% of the total number of respondents contacted, which was 590. This survey was conducted from August to October 2015.

Data analysis

We used independent sample T-test to analyze the responses in groups of gender (male and female) and user types (student and staff). Moreover, the responses to the questions based on age, education level and place of work were analyzed via One-Way Analysis of Variance (ANOVA), with Turkey's range test ($\alpha \leq 0.05$). All statistical analysis was completed using the "Statistical Package for the Social Sciences" (SPSS) 23.0.

Results

Comparison of the Level of Green Space Use

Levene's test also confirmed the equality of variances in this study. Significant differences were found among user types, place of work, and age groups in the level of green space use (Tables 1, 2 and 3). As can be seen in Fig. 1, averages of 53.7% of students and 42.73% of staff have used the campus green space. Among the faculties and buildings in the current study, the most usage of green space was observed in the ITS Center, and the Agriculture, Theology and Humanity Sciences Faculty, with 60%, 58%, 57% and 56% respectively.

The least popularity of green space use was observed in the Physical Education Faculty, and the Herbaceous Sciences Research Center with 26% and 30% respectively (Fig. 3). The highest percentage of green space use (56.2%) was found in the age group of 25–40 years, with no significant difference among other age groups (Fig. 2). Analysis showed that there is no significant difference among gender and education level in the use of the campus green space at the Ferdowsi University of Mashhad.

Table 1. Independent sample test between user types for comparison of the level of green space use

	T-test for Equality of Means				
	t	df	Sig.	Mean Difference	Std. Error Difference
Equal variances assumed	5.07	596	0.00	0.548	0.108
Equal variances not assumed	5.11	334.58	0.00	0.548	0.107
Levene's Test for Equality of Variances	-	-	0.997	-	-

Table 2. ANOVA among place of work for comparison of the level of green space use

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	56.153	16	3.510	2.402	0.002
Within Groups	849.019	581	1.461	-	-
Total	905.172	597	-	-	-
Levene Statistic	-	16 and 581	-	-	0.053

Table 3. ANOVA among age for comparison of the level of green space use

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	53.44	3	17.81	12.42	0.000
Within Groups	842.16	587	1.43	-	-
Total	895.6	590	-	-	-
Levene Statistic	-	3and 587	-	-	0.052

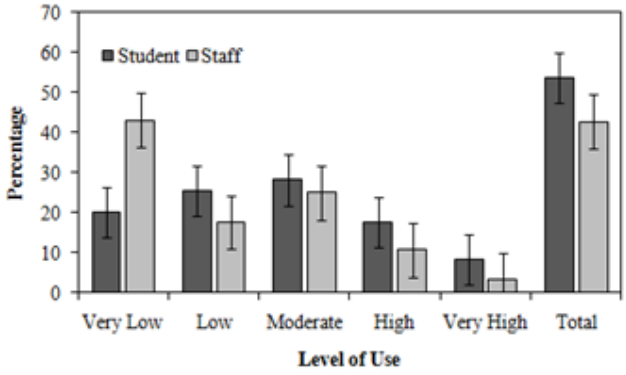


Figure 2. Percentage of level of campus green space use among of age groups (Above) and between students and staffs (Below).

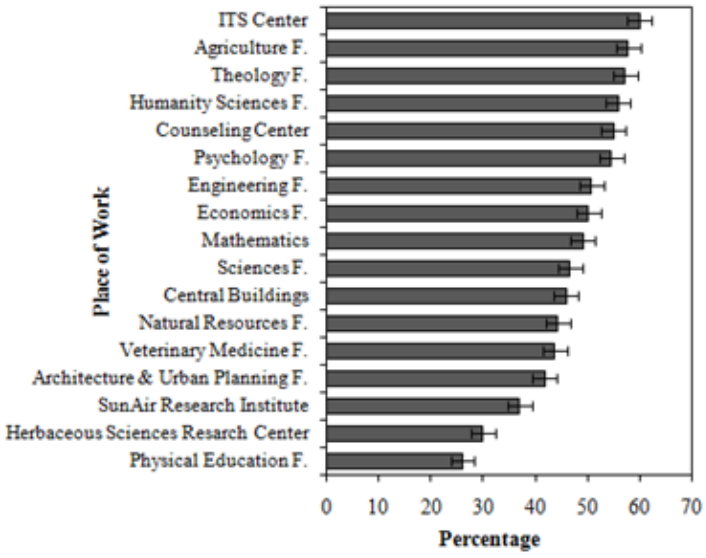


Figure 3. Percentage of campus green space use among faculties and buildings

Comparison of the Aesthetics Preference

The results indicated that the aesthetics preferences of respondents on the whole university campus and also per faculty or building, among places of work, and between male and female were significantly different (Table 4 and 5).

As can be seen in Fig. 3, the highest and lowest percentage of aesthetics preference for the whole university campus was related to respondents from the Faculty of Physical Education (82%), and the Architecture & Urban Planning Faculty, Herbaceous Sciences Research Center, and ITS Center (54.55%, 55% and 56.67%) respectively.

As per faculty or building, respondents from the Counseling Center (80%), the Physical Education Faculty (76%) and the Agriculture Faculty (75.1%) indicated the highest percentage of aesthetics preference about their place of work. The lowest percentage of aesthetics preference about their place of work was found in the Sun-Air Research Center with 36.92%. The mean percentage of aesthetics preference of respondents about the whole university was 70.64% (Fig. 4). Moreover, in the whole university campus and also as per faculties or buildings, female respondents as compared to male respondents, showed a higher percentage of aesthetics preference, averaging 69.7% and 66.2% respectively, aesthetics (Fig. 5).

Comparison of the Safety Preference

In terms of safety preference, significant differences were found among place of work as per faculty or building, and between female and male in the whole university, and also as per faculty or building (Tables 6 and7). According to Fig. 5, respondents from seven faculties or buildings showed the highest percentage of safety preference about their place of work with a mean percentage of 71.95%. The lowest percentage (40%) was seen from the respondents from the Sun-Air Research Center. The average of safety preference in the whole university was 66.8%.

The highest percentage of safety preference for the whole university campus was related to respondents from 11 faculties and buildings with a mean percentage of 73.51%. Respondents from five faculties and buildings were found having the lowest percentage of safety preference for the whole university campus with a mean percentage of 64.06% (Fig. 6).

Table 4. ANOVA of aesthetic preference among place of work

		Sum of Squares	df	Mean Square	F	Sig.
Whole of university campus	Between Groups	25.78	16	1.61	1.92	0.02
	Within Groups	487.05	581	0.84	-	-
	Total	512.83	597	-	-	-
Levene Statistic	-	-	16 and581	-	-	0.125
Per faculty or building	Between Groups	77.338	16	4.83	4.04	0.00
	Within Groups	688.928	576	1.19	-	-
	Total	766.266	592	-	-	-
Levene Statistic	-	-	16 and576	-	-	0.10

Table 5. Independent sample test of aesthetic preference between genders

		Levene's Test		T-test for Equality of Means				
		F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference
Whole of university campus	Equal var. ass.	0.53	0.82	2.05	590	0.41	0.16	0.77
	Equal var. not ass.	-	-	2.05	510.36	0.41	0.16	0.77
Per faculty or building	Equal var. ass.	2.15	0.14	1.96	585	0.05	0.19	0.95
	Equal var. not ass.	-	-	1.94	492.29	0.05	0.18	0.96

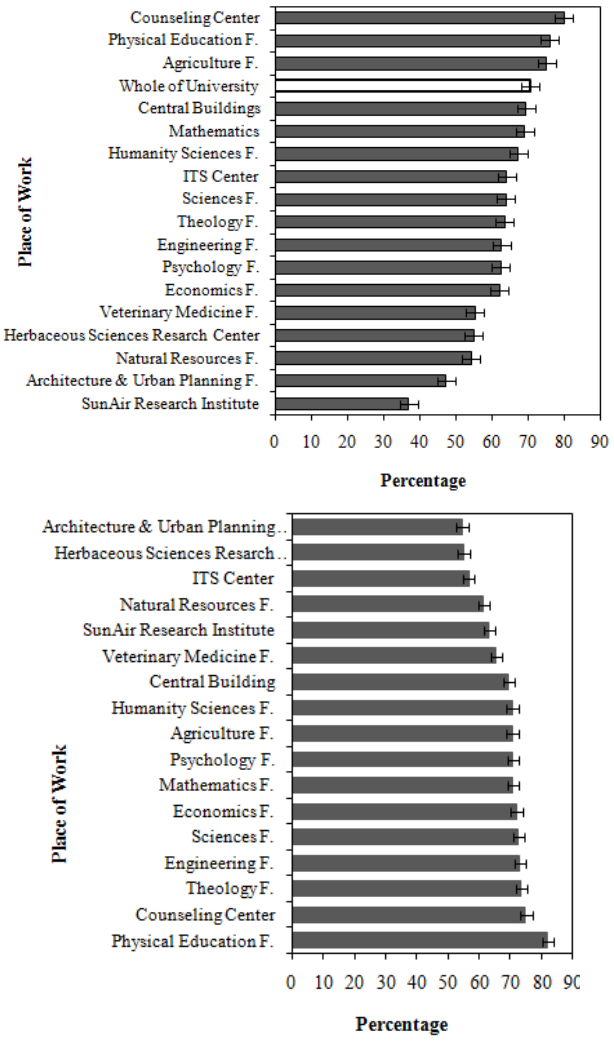


Figure 4. Percentage of Aesthetic Preference in the whole of University Campus (Left) and in per faculty or building (Right)

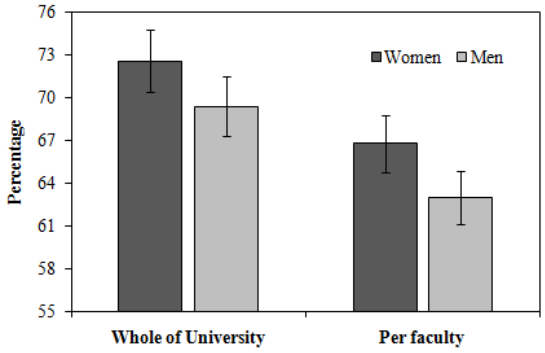


Figure 5. Percentage of aesthetic preference between female and male in preference in the whole of University Campus and in per faculty or building

As can be seen in Fig. 7, the percentage of safety preference in female respondents (averaging 72.3%), compared to male respondents (averaging 66.4%) was higher in the whole university campus and also as per faculties or buildings.

As can be observed in Fig. 8, the linear correlation between the percentage of aesthetics preference and the percentage

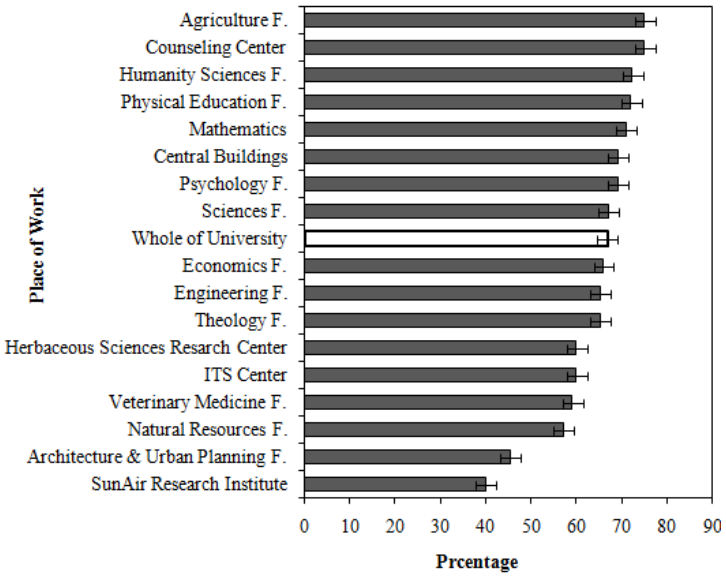
of safety preference with the percentage of green space use was less than 1% (R^2=0.015). The correlation between the percentage of aesthetics preference and the percentage of safety preference was about 78% (R^2=0.78).

Table 6. ANOVA of Safety preference among place of work

		Sum of Squares	df	Mean Square	F	Sig.
Per faculty or building	Between Groups	65.23	16	4.07	3.29	0.00
	Within Groups	708.86	572	1.24	-	-
	Total	774.08	588	-	-	-
Levene Statistic	-	-	16 and 572	-	-	0.123

Table 7. Independent sample test of Safety preference between genders

		Levene's Test		T-test for Equality of Means				
		F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference
Whole of university campus	Equal var. ass.	2.26	0.13	2.59	585	0.01	0.215	0.083
	Equal var. not ass.	-	-	2.62	521.55	0.009	0.215	0.082
Per faculty or building	Equal var. ass.	0.90	0.34	3.091	581	0.002	0.296	0.096
	Equal var. not ass.	-	-	3.07	490.02	0.002	0.296	0.096



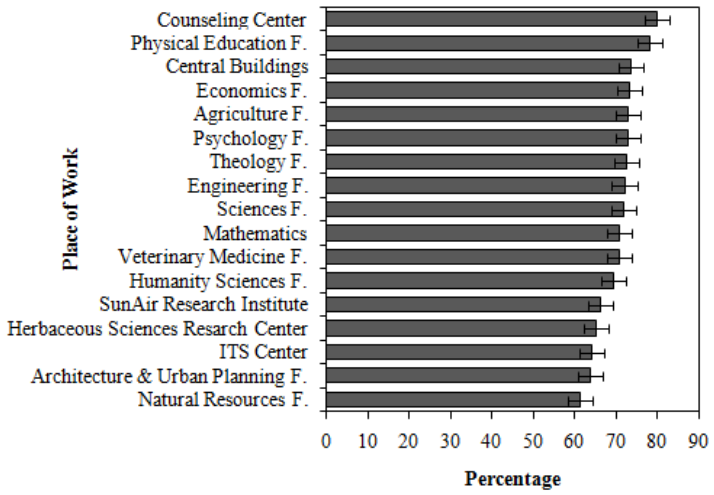


Figure 6. Percentage of safety preference in the whole of University Campus (Left) and in per faculty or building (Right)

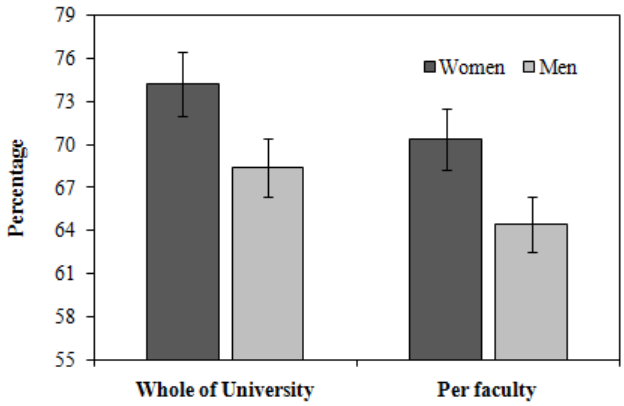


Figure 7. Percentage of safety preference between female and male in preference in the whole of University Campus and in per faculty or building

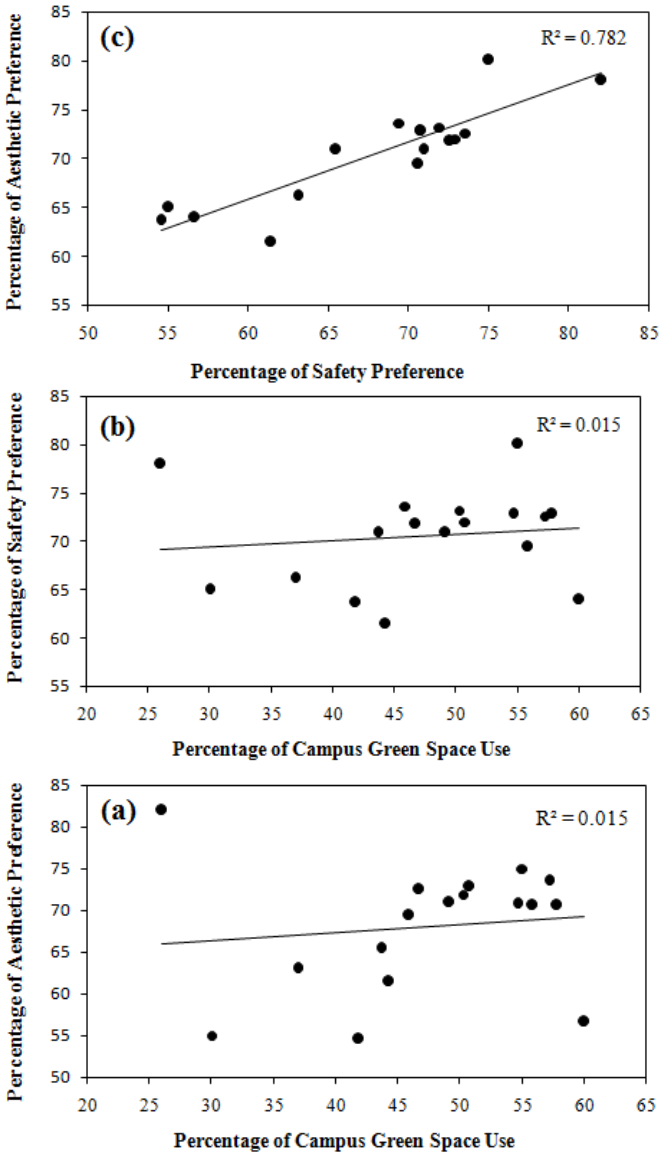


Figure 8. Linear correlation between percentage of aesthetic preference (a), percentage of safety preference (b) and percentage of green space use and aesthetic preference and percentage of safety preference (c).

Discussion

Our study yields four main results. First, more than 80% of respondents used the campus green space over 40% (less than moderate). Second, the mean aesthetics preference of respondents in the whole university campus and also as per faculty or building was over 68% and 63% aesthetics (more than moderate) respectively. Third, responses showed that the mean safety preference in the whole university campus and also as per faculty or building was over 70% and 64% (more than moderate) respectively. Finally, although the level of green space use was not associated with aesthetics and safety preference, there was a strong correlation (close to 80%) between aesthetics preference and safety preference by respondents.

There are many features in a campus that can attract students, such as shaded areas, areas that are easy to access, areas with uncontrolled atmosphere, seating facilities, power supply, spaciousness, and areas to view people passing by (Hanan, 2013). Moreover, aesthetics and safety features can affect the level of use of campus green space (Stepan *et al*., 2014).

The mean percentage of use for the Ferdowsi University campus was less than half, since the aestheticsaesthetics and safety preference of respondents was relatively high (averaging 65%, and 70% respectively) on the campus, Therefore, other factors like facilities, pleasant atmosphere, climatic conditions and or other unknown factors can be involved in this issue. Research shows that landscape aesthetics perception is a product of multi-sensory stimuli and the integration of senses, like eyesight (visual aspect), olfactory, auditory and tactile (Uzzell, 1989; Chen *et al*., 2009). According to the theories of landscape preference, nine visual indicators that consist of complexity, coherence, disturbance, stewardship**,** imageability, visual scale, naturalness, historicity, and ephemera, play a key role in landscape aesthetics preference (Ode *et al*., 2008). Although in this study, the aesthetics factors have not been evaluated, according to the relatively high percentage of aesthetics preference by respondents, it seems that the factors affecting aesthetics preference as well as the mentioned visual indicators are in acceptable condition. Our findings about the effect of gender on aesthetics preference are consistent with previous studies. A variety of demographic factors (age, gender, etc.) have been shown to be factors in the aesthetics preferences of the general public (Lyons, 1983).

Our study showed that safety preference was most strongly correlated with the aesthetics preference (R^2 = 0.78). This study has presented a general report of green space perception at the Ferdowsi University campus. There are many factors that influence the safety of green spaces. For example, the physical characteristics that green space users associate with unsafe environments include, poor lighting, confusing layout, physical and aural isolation, poor visibility, no access to help, areas of concealment, poor maintenance, vandalism, and the presence of undesirables (Yücel, 2006). Our finding in the study supports the sense of safety in the campus green space (about 70% safety preference). A noticeable point in the finding is that although some research shows that females don't use green spaces in most cases because of a lack of the feeling of safety (Patrick, 2002), our results indicated that the female respondents feel safer (about 6%) on the campus green space than their males counterparts. Drottenborg (1999)

reported a possible relationship between aesthetics and safety that is described through interdisciplinary research within arts and aesthetics, environmental psychology, and traffic safety. One study indicated that students with higher perceived campus greenness reported a greater quality of life, a pathway significantly and partially mediated by perceived campus restorativeness (Hipp *et al*., 2015).

Conclusion

This study confirmed that some demographic factors (age and gender), user type, and place of work affected the green space usage and the aesthetics and safety preferences by users. In total, the percentage of the campus green space usage, and the aesthetics and safety preferences were near and above the medium (50%), respectively. The study also found a strong correlation between the aesthetics and safety preference by users.

The findings from the current study have some recommendations for future research and also for managers of the University Campus. First, an investigation into the reasons for the relatively low usage of campus green space by users. Second, identify the factors influencing the aesthetics and safety perception of users. Third, understand the role of demographic factors, user type, and place of work on the campus green space use, and also on aesthetics and safety preferences.

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