

# Physical Factors Influencing Place Identity in Higher Education Environments (Case study: Islamic Azad University, South Tehran Branch)

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## Abstract

Developing student's academic identity is essential for achieving academic success in universities. In this regard, environmental psychologists believe that physical context directly affects the level of ones' place identity. In other words, more positive assessment of the environment results in higher place identity. It implies that the designer can strengthen the bond between person and place by detecting and improving the effective environmental factors. Accordingly, the aim of this study was to identify the physical attributes that improve students' place identity in higher education spaces. For this purpose, after evaluating the students' place identity and their satisfaction with the physical context, the link between the quality of each physical element and students' place identity was investigated. The population of the study included all the students of Islamic Azad University South Tehran Branch in 2013-2014 academic years. According to Cochran formulas, sample consisting of 379 students from Faculties of Art and Architecture, Engineering, and Sciences was proportionally selected. Data collection instrument was a researcher-made questionnaire which the calculated Alpha coefficient and fitness indices proved its validity and reliability. Correlation and multiple regression analyses were conducted to examine the relationship between mentioned variables. The results indicate that the quality of the acoustic conditions, access to public transport & intrusive reflections are irrelevant to students' level of place identity. Above all, satisfaction with the amount of green space, quality of lighting, accessibility and indoor thermal conditions, are the most important physical factors influencing students' place identity in higher education environments.

**Keywords:** Place Identity, Physical Context Quality, Student's Satisfaction, Environmental Psychology, Campus Planning & Design.

## 1. Introduction

Universities as the educator of the next generation have an increasing role in human resource development. One of the essential roles of these institutions is developing the academic identity of the students (Bagheri&Heydari, 2013: 558). This seems more critical in the modern society that identity crisis has changed into one of the most important challenges (Naghizadeh&Toghiani, 2012: 73) and has led to recently-developed concerns including "place identity crisis".

Place identity as the substructure of self-identity (Pakzad, 1996: 104), is one's strong emotional attachment to a particular place (Chow & Healey, 2008: 265). This bond develops while interaction with the place (Ghasemi&Esfahani, 2004: 74) and results in one's commitment towards it. (KavianiRaad&Fattahi, 2002: 32). Thus, improving students' academic identity results in better performance of students in academic environments.

According to the previous researches, higher levels of place identity in university, results in higher academic success, more desire to learn, efficient communication with professors and students. On the other hand, lack of it causes weakness in teamwork, lack of motivation, low participation and loss of academic moral. However, unfortunately, many studies have revealed that

Universities are seriously weak in developing the students' academic identity (Ibid).

According to environmental psychology, using the results of behavioral and social studies in the design process is the only solution for the place identity crisis (Emamgholi, 2013: 24). This field describes the relation between physical environment and identity in two ways: "identity of place" and "place identity". More important is that identity of place, which relates to the features of the place, directly affects the quality of place identity. Hence those with a more positive assessment of their environment will have higher place identity (Rezazade, 2001: 6). It implies that the physical environment is an intermediate link between these two concepts. Therefore, the designer can strengthen the bond between person and place by detecting and improving the intermediate qualities using environmental psychology (Golrokh, 2013: 101).

According to Fritz Steele (1982), physical factors including the size, proportions, and color of the place, affect one's perception of place. Hemmati et al. (2015) in their study on academic identity, introduce physical environment, as the source of academic identification. In fact, the physical environment houses the formal learning components. Besides, it simultaneously reflects and shapes the values of an educational environment because

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of its direct impact on individuals' behaviors and experiences (Sturmer, 1972: 97).

As mentioned above, the physical environment can improve place identity and in the exact same way; place identity can develop achievements of higher education institutions. Therefore, the purpose of this paper is to detect the physical factors of higher educational spaces that improve this sense among the students.

For this purpose, students' satisfaction with the physical environment of their university, as well as their sense of place identity, evaluated. Afterwards, the effect of each physical factor on the students' place identity investigated. Ultimately, the factors with the most influence introduced.

## 2. Research Questions

As mentioned previously, the aim of this research is to answer the following questions;

- Specifically in higher education environments, quality of which physical factors correlate with the students' sense of place identity?
- Satisfaction with which physical elements has the most correlation with the students' sense of place identity?

Hence, the general hypothesis of this study is:

- "Satisfaction with physical environment of the university, positively affects students' sense of place identity"; which according to the typology of physical factors, divides into some detailed sub-hypotheses.

## 3. Literature Review

### 3.1. Place Identity in Academic Environment

The concept of "Place Identity" is developed by Proshansky et al. (1983). They describe place identity as "the individual's incorporation of place into the larger concept of self".

As Twigger-Ross & Uzzell (1996: 206) discuss, there are two distinct ways in which place relates to identity. The first one is place identification which happens when one expresses his identity with a place; just as when one from London refers to himself as a Londoner. In this concept, place is defined as a social category.

The second one is place identity; an aspect of identity which describes the person's socialization with the physical world.

According to Hemmati, et al. (2015), place identity in university improves both "future orientation" and "self-efficacy" of the students. "Future orientation" is one's ability to imagine or consider future life circumstances (Steinber et al., 2009) and motivates learning and goal-setting (Peetsma & Van der Veen, 2011). On the other hand, "self-efficacy" is the measure of one's beliefs in own ability to perform an action, complete a task or attain a goal (Lampert, 2007; Schunck, 1991). High self-efficacy results in working harder, persisting longer in facing difficulties (Schunk, 1991), as well as academic and social achievements (Bandura et al., 1996; Choi, 2005).

### 3.2. Physical Environment and its Elements

Environmental psychologists (1996) believe that physical context affects place identity. Hence in the following, after reviewing the mentioned factors in previous researches, the considered elements for this study are introduced and classified.

According to McCoy (2002: 449), some features of the physical environment that support team communication and collaboration are as follows:

- Location; including the convenience of access.
- Furniture; including types of furniture and their arrangement.
- Lighting; brightness or dimness of place, controllability of lighting, placement of light sources (overhead, on side walls or tables).
- Color and Texture.

Specifically, in academic environments, Cheryan et al. (2014: 5-6) mention to some effectual physical factors as below:

- Lighting: As they mention, the result of previous studies of Edwards & Torcelli (2002) and Tanner (2008) shows that students exposed to more natural light in their classrooms, perform better. They also discuss that according to Benya (2001), incorporating daylight into classrooms should be done carefully, to avoid visual discomfort and temperature increase.

- Acoustic conditions: They, according to Klatt et al. (2013), mention that excessive external noise hinders learning. In other words, classrooms with greater external noise are more likely to have lower student achievement.

- Temperature: They mention to the optimal temperature range for learning and believe that the temperature lower or higher than this range worsens the performance of the students.

- Air Quality: They mention to Schneider (2002) which points out that low-quality air results in both decreased student attendance and teachers' less ability to teach well.

- Classroom Layout: According to Burgess & Kaya (2007) & Martin, (2002), they mention to the influence of furniture arrangement on how comfortable students feel and the quality of their interaction with other students and the teacher. They, according to Wannarka & Ruhl, (2008), introduce task demands and learning goals as two essential considerations in selecting optimum seating arrangements.

On this basis, physical items of the environment, according to their relevance to indoor or outdoor and their perception type, classified into five main clusters:

- Visual Indoor Factors; including lighting and color.
- Visual Indoor- Outdoor Factors; including furniture and material.
- Sensory Indoor Factors; including indoor air quality and acoustic conditions.
- Sensory outdoor Factors; including open space and access.
- Sensory Indoor- outdoor Factors; including spatial dimensions.

The possible effect of these factors on the formation of the students' place identity is investigated in the sequel.

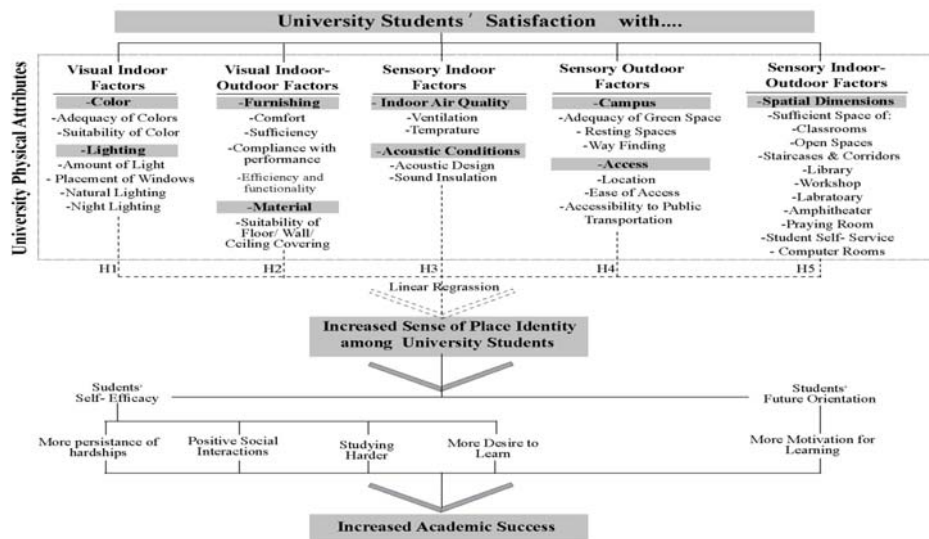


Fig. 1. Theoretical framework of study

**4. Research Methodology**

**4.1. Theoretical Framework**

Based on the derived theoretical framework (Fig.1), the basic proposed hypothesis divides into five detailed sub-hypotheses as follows:

H1: Students' satisfaction with visual indoor factors (lighting and color of spaces) correlates with place identity.

H2: Students' satisfaction with the visual indoor-outdoor factors (furniture and material) correlates with place identity.

H3: Students' satisfaction with sensory indoor factors (air quality and the acoustic conditions of spaces) correlates with place identity.

H4: Students' satisfaction with sensory outdoor factors (open space and access) correlates with place identity.

H5: Students' satisfaction with the sensory indoor-outdoor factors (spatial dimensions of spaces) correlates with place identity.

**4.2. Sampling**

The population of the study includes all of the students of Islamic Azad University South Tehran Branch in 2013-2014 academic year. Using stratified random sampling method, a sample consisting of 379 students (calculated via Cochran sample size

formulas) were proportionally selected from faculties of Art and Architecture, Technical-Engineering and Sciences.

**4.3. Data Collection**

Due to lack of the standard scale in this field, data collection instrument was a researcher-made questionnaire. It consists of two parts that respectively evaluate "place identity" and "satisfaction with the physical environment of the university". The place identity scale is designed based on the place attachment model of William and Vaske (2003) and Harmon et al. (2006). The satisfaction scale evaluates students' view on the quality of lighting, color, indoor air, acoustic conditions, furniture, materials, open space, campus accessibility and spatial dimensions, using 41 questions. Both questionnaires valued on the five-point Likert scale (strongly agree= 5, agree= 4, neutral= 3, disagree= 2, strongly disagree= 1).

**4.4. Reliability of the Questionnaires**

Reliability is the degree to which an assessment tool produces stable and consistent results. The calculated Cronbach's alpha values (higher than 0.6 for all components) prove the reliability of the questionnaires (Table1).

Table 1

Alpha coefficient reliability test result

Questionnaire	Factor	Cronbach's Alpha	Coefficients
Place Identity	-	-	0.681
	Color	0.815	
Satisfaction with Physical Factors	Lighting	0.601	0.910
	Furniture and Layout	0.705	
	Open Space	0.709	
	Indoor Air Quality	0.680	
	Acoustic Conditions	0.627	
	Spatial Dimensions	0.842	
	Accessibility	0.804	
	Material	0.826	

Validity refers to how well a test measures what it is purported to measure. In this study, Absolute, Comparative and Parsimonious fit indices are calculated for testing validity of the questionnaires. The results are as presented in Table2 Chi-squared largely depends on the sample size and does not provide accurate results for more than 200 questionnaires. However, dividing the value by the degrees of freedom reduces its dependence on the sample size and makes the results acceptable. Other fit indices don't depend on sample size, and their value for both models prove the questionnaires' validity.

**4.5. Data Analysis**

The collected data are analyzed by SPSS19 software using descriptive and inferential statistical methods. Correlation and multiple regression analyses are conducted to examine the relationship between place identity and various potential predictors. In the first step, the research hypotheses are tested through analyzing correlation coefficients which

indicates the strength and direction of the relationship between each independent variable (physical features of place) and the dependent variable (place identity). Unlike correlation, regression measures the predictive power of variables, hence in the second step; multiple regression analysis is conducted for recognizing the most efficient factors.

**5. Results**

**5.1. Descriptive Analysis**

The result of analyzing demographic variables (gender, educational status, age, etc.), dependent variable (place identity) and independent variables (satisfaction with physical factors of the university environment) using descriptive statistics of frequency and percentage shows that:

**5.1.1. Demographic Variables**

44% of respondents are female students, while 56% of them are male. Most respondents (67.3%) are from 20 to 25, 12.7% of them are less than 20 and 19.3% of them are over 25 years old. The majority (77 .1%) of respondents are bachelor student (Table3).

Table 2  
Fit indices for study models

Index		Acceptable	Good	Model Fitness	
				Q1*	Q2**
Absolute Fit Indices	Chi-Squared	X2 200<n<50 (Hooman, 2005)	X2& %5< P (Hooman, 2005)	-	-
	Goodness of Fit Index	GFI %90<GFI (Hoyle &Panter, 1995)	%95< GFI< %100 (Hoyle &Panter, 1995)	%97. 8	%52. 8
	Adjusted Goodness Of Fit Index	AGFI %90< GFI< %95 (Hoyle &Panter, 1995)	%95< GFI< %100 (Hoyle &Panter, 1995)	%95. 3	%69. 1
Comparative Fit Indices	Tucker Lewis Index Or Non-Normed Fit Index	NNFI/TLI %90< TLI (Hu &Bentler, 1999)	%95< TLI (Hu &Bentler, 1999)	%96. 6	%98.9
	Normed Fit Index	NFI %90< NFI (Byrne, 1994)	%95 < NFI (Schumacher& Lomax, 2004)	%96. 0	%97. 6
	Comparative Fit Index	CFI %90 < CFI (Byrne, 1994)	%93< CFI (Bollen, 1989)	%98. 0	%99. 5
	Relative Fit Index	RFI %90 < RFI	approx. 1 (Bollen, 1989)	%93. 5	%94. 0
	Incremental Fit Index	IFI %90 < IFI	approx. 1 (Bollen, 1989)	%98. 0	%99. 6
Parsimonious Fit Indices	Parsimonious Non Normal Fit Index	PNFI approx.%50	%60< PNFI (Ghasemi,2010)	%58. 3	%39. 0
	Root Mean Square Error of Approximation	RMSEA %5 <RMSEA< %8 (Hoyle & Panter, 1995)	%0 <RMSEA< %5 (Hoyle &Panter, 1995)	%5. 1	%2. 42
	Minimum Discrepancy Divided By Its Degrees of Freedom	CMN.df 2 <CMN .df< 5 (Schumacker & Lomax, 2004)	0 <CMN .df< 2 (Ullman, 2001)	1. 993	1. 21

\*Q1= Questionnaire Evaluating Place Identity \*\*Q2= Questionnaire Evaluating Satisfaction from Physical factors

Table 3  
Descriptive analysis of demographic variables.

Variable		Frequency	Percentage
GENDER	FEMALE	212	%56.4
	MALE	164	%43.6
	TOTAL	376	%100
AGE	UNDER 20	47	%12.7
	20-25	253	%67.28
	30-25	51	%13.56
	35-30	13	%3.45
	40-35	6	%1.59
	45-40	2	%0.5
	50-45	1	%0.25
	TOTAL	376	%100
FACULTY	ART AND ARCHITECTURE	122	%32.4
	ENGINEERING	148	%39.4
	SCIENCE	106	%28.2
	TOTAL	376	%100
GRADE	BACHELOR	290	%77.1
	MASTER	86	%22.9
	PH.D.	0	%0
	TOTAL	376	%100
CITY OF RESIDENCE	TEHRAN	358	%92.5
	OTHER CITIES	18	%4.8
	TOTAL	376	%100

### 5.1.2. Dependent Variables (Place Identity)

48.7% of students have an average level of place identity

towards the university. The study shows the same result for each faculty (Table4).

Table 4  
Descriptive analysis of dependent variables

Dependent variable	Faculty	High		Average		Low	
		F	%	F	%	F	%
Place Identity	Engineering	51	%34.5	75	%50.7	12	%14.2
	Art	49	%40.2	62	%50.8	11	%9
	Sciences	24	%22.6	46	%43.4	36	%34
	Total	124	%33	183	%48.7	68	%18.1

### 5.1.3. Independent Variables (Satisfaction with Physical Attributes)

According to the Table5, student's satisfaction with the physical factors is generally average or less than average (Table5).

Table 5  
Descriptive analysis of independent variables

Independent Variable	Faculty	High		Average		Low	
		F	%	F	%	F	%
Satisfaction from Physical Environment	Engineering	19	%12.8	101	%68.2	23	%15.5
	Art	2	%1.6	64	%52.2	53	%43.4
	Sciences	0	%0	52	%49.1	45	%42.5
	Total	21	%5.6	217	%57.7	121	%32.2

According to the Table6, students have the most discontent with the color of spaces (59.8%), while the most satisfaction is from acoustic conditions. despite an

average level of satisfaction with illumination qualities, most of the students are not satisfied with the spatial dimensions and indoor air quality (Table6).

Table 6  
Descriptive analysis of physical factors

Physical Factors	Faculty	High		Average		Low		
		F	%	F	%	F	%	
Sensory Indoor Factors	Color	Engineering	19	%12.8	69	%46.6	60	%40.5
		Art	5	%4.1	34	%27.9	83	%68
		Sciences	10	%9.4	14	%13.2	82	%77.4
		Total	34	%9	117	%31.1	225	%59.8
	Light	Engineering	38	%25.7	95	%64.2	15	%10.1
		Art	9	%7.4	72	%59	41	%33.6
		Sciences	8	%7.5	72	%67.9	25	%23.6
		Total	55	%14.6	239	%63.6	81	%21.5
Visual Indoor- Outdoor Factors	Furniture	Engineering	17	%11.5	82	%55.4	48	%32.4
		Art	9	%7.4	43	%35.2	70	%57.4
		Sciences	7	%6.6	32	%30.2	67	%63.2
		Total	33	%8.8	157	%41.8	185	%49.2
	Materials	Engineering	31	%20.9	81	%54.7	31	%20.9
		Art	10	%8.2	46	%37.7	64	%52.5
		Sciences	9	%8.5	33	%31.1	60	%56.6
		Total	50	%13.3	160	%42.6	155	%41.2
Sensory Indoor Factors	Indoor Air Quality	Engineering	17	%11.5	72	%48.6	57	%38.5
		Art	7	%5.7	49	%40.2	66	%54.1
		Sciences	5	%4.7	34	%32.1	65	%61.3
		Total	29	%7.7	155	%41.2	188	%50
	Acoustic Conditions	Engineering	33	%22.3	82	%55.4	30	%20.3
		Art	36	%29.5	65	%53.3	21	%17.2
		Sciences	45	%42.5	49	%46.2	8	%7.5
		Total	114	%30.3	196	%52.1	59	%15.7
Sensory Outdoor Factors	Open Space	Engineering	20	%13.5	88	%59.5	39	%26.4
		Art	9	%7.4	45	%36.9	67	%54.9
		Sciences	0	%0	28	%26.4	78	%73.6
		Total	29	%7.7	161	%42.8	184	%48.9
	Access	Engineering	45	%30.4	60	%40.5	42	%28.4
		Art	59	%48.4	43	%35.2	18	%14.8
		Sciences	41	%38.7	40	%37.7	25	%23.6
		Total	145	%38.6	143	%38	85	%22.6
Sensory Indoor- Outdoor Factors	Spatial Dimensions	Engineering	33	%22.3	73	%49.3	41	%27.7
		Art	4	%3.3	36	%29.5	79	%64.8
		Sciences	4	%3.8	24	%22.6	77	%72.6
		Total	41	%10.9	133	%35.4	197	%52.4

## 5.2. Inferential Analysis

### 5.2.1. Hypothesis test: Place Identity and Physical Environment

According to the Table 7, sensory internal factors, including air quality and acoustic conditions have the

least correlation with place identity. However, this relation is stronger for sensory interior/exterior factors, including spatial dimensions.

Table 7.  
Correlation coefficient for physical environment factors quality and place identity

Variables	Sensory Indoor Factors	Visual Indoor- Outdoor Factors	Sensory Outdoor Factors	Sensory Indoor Factors	Sensory Indoor - Outdoor Factors
Correlation Coefficient	0.202	0.229	0.248	0.149	0.276
Sig.	0.000	0.000	0.000	0.004	0.000

The result of detailed analysis of each variable is as follows:

**- H1: Sensory Indoor Factors; Lighting and Color:** According to the Table 8, although place identity is significantly correlated ( $p < .05$ ) with the suitability of colors ( $r = 0.2$ ), adequacy of color ( $r = 0.18$ ), adequacy of

light ( $r = 0.232$ ), adequacy of natural light ( $r = 0.157$ ) and night lighting ( $0.213$ ), it has a no significant correlation ( $p > 0.05$ ) with intrusive reflections. Overall, quality of both light ( $r = 0.161$ ) and color ( $r = 0.232$ ) have positive, direct impact on place identity of students. Evaluating the factors of these two variables shows that adequacy of

light, night lighting, suitability of colors and adequacy of color are the most to the least relevant factors, respectively. The results support the first hypothesis and

admit that the quality of color and lighting are positively correlated with students' level of place identity.

Table 8  
Correlation coefficient for sensory indoor factors quality and place identity

Variable	Color			Light				
	Suitability of Colors	Adequacy of Color	Total	Adequacy of Light	Reflection on Board	Adequacy of Natural Light	Night Lighting	Total
Correlation Coefficient	0.200	0.181	0.206	0.232	-0.062	0.157	0.213	0.161
Sig.	0.000	0.000	0.000	0.000	0.230	0.002	0.000	0.002

**-H2: Visual Indoor-Outdoor Factors; Furniture and Materials**

The results show that the quality of furniture and materials used in interior and exterior design has direct positive relation to place identity. According to the Table 9, comfort (r = 0.204), adequacy (r = 0.168) and interaction suitability (r = 0.182) of furniture along

with quality of floor covering (r = 0.129), wall covering (r = 0.221) and ceiling covering (r = 0.154) are significantly correlated with place identity (p < 0.05). On this basis, suitability of class layout and floor covering have the most and the least relation to the students' place identity, respectively.

Table 9.  
Correlation coefficient for visual indoor-outdoor factors quality and place identity

Variable	Furniture					Materials			
	Comfort	Adequacy	Interaction Suitability	Course-Type Suitability	Total	Floor Covering	Wall Covering	Ceiling Covering	Total
Correlation Coefficient	0.204	0.168	0.243	0.182	0.255	0.129	0.221	0.154	0.184
Sig.	0.000	0.001	0.000	0.000	0.000	0.013	0.000	0.003	0.000

**-H3: Sensory Indoor Factors, Air Quality and Acoustic Conditions:** According to the Table 10, only the quality of indoor air (r = 0.244, p < 0.05) has positive direct impact

on place identity. The results also reject the relation between acoustic conditions and place identity (p > 0.05).

Table 10  
Correlation coefficient for sensory indoor factors quality and place identity

Variable	Indoor Air Quality			Acoustic Conditions		
	Thermal Condition	Ventilation	Total	Acoustic Design	Sound Insulation	Total
Correlation Coefficient	0.251	0.208	0.244	0.015	-0.089	-0.044
Sig.	0.000	0.000	0.000	0.770	0/085	0.393

**-H4: Sensory Outdoor Factors; Open Space and Access:** According to the Table 11, both sensory outdoor factors have positive direct impact on place identity. The

results also reject the relation between access to public transport and place identity.

Table 11  
Correlation coefficient for Sensory outdoor factors quality and place identity

Variable	Open space					Access			
	Adequacy of green space	Appropriate places for rest	Adequate restrooms	Wayfinding	Total	Location	Ease of access	Public transport	Total
Correlation coefficient	0.293	0.123	0.186	0.107	0.244	0.193	0.171	0.052	0.177
Sig.	0.000	0.017	0.000	0.038	0.000	0.000	0.001	0.319	0.001

**-H5: Sensory Outdoor /Indoor Factor; Spatial Dimensions:** According to the Table 12, spatial dimensions of the classrooms (r = 0.122), open space (r = 0.216), corridor and staircase (r = 0.275), library (0.131), The dimensions of circulation spaces and the classrooms have the most and the least correlation with the students' place identity, respectively.

workshops and labs (r = 0.227), amphitheater (r = 0.185), praying room (r = 0.229), students' self-service (r = 0.204) and computer room (r = 0.211) are significantly correlated with place identity (p < 0.05).

Table 12  
Correlation coefficient for sensory outdoor- indoor factors quality and place identity

Variable	Spatial Dimensions								
	Classroom	Open Space	Corridor & Staircase	Library	Workshop s And Labs	Amphithe ater	Praying Room	Self-Service	Computer Lab
<b>Correlation Coefficient</b>	0.122	0.216	0.275	0.131	0.227	0.185	0.229	0.204	0.211
<b>Sig.</b>	0.018	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000

**- Question:** Which physical factors have the most influence on place identity in higher education spaces? To evaluate the effect of factors, all variables related to the physical environment were entered into the regression equation using Enter method. Then because of the collinearity problem, the Step by Step method replaced. The results in the Table13 show that four variables, including adequate green space, adequate lighting, ease of

access and thermal conditions are the best predictors of place identity. The four predictors explain 15.6 % of the variance (R<sup>2</sup>=.156, p<.01). The regression model becomes:  
Place identity= 1.992+0.130 Adequacy of green space +0.128 Adequacy of light + 0.085 Ease of access+ 0.098 Thermal conditions

Table 13  
Output of linear regression analysis

Model	Model Summary			ANOVA		Coefficients				
	R	R Square	Adjusted R Square	F	Sig.	B	Beta	t	Sig.	
1	(Constant)					2.644	-	28.157	0.000	
	Adequate Green Space	0.289	0.084	0.081	32.823	0.000	0.208	0.289	5.729	0.000
2	(Constant)					2.313	-	18.798	0.000	
	Adequate Green Space	0.352	0.124	0.119	25.320	0.000	0.167	0.232	4.504	0.000
3	(Constant)					2.086	-	14.315	0.000	
	Adequate Green Space	0.378	0.143	0.136	19.894	0.000	0.155	0.215	4.207	0.000
Adequate Lighting	0.149						0.192	3.752	0.000	
Ease Of Access	0.094						0.141	2.837	0.000	
4	(Constant)					1.992	-	13.277	0.000	
	Adequate Green Space	0.396	0.156	0.147	16.551	0.000	0.130	0.181	3.423	0.000
	Adequate Lighting						0.128	0.165	3.169	0.000
	Access Ease Of						0.085	0.128	2.572	0.005
Thermal	0.098						0.128	2.395	0.008	



## 6. Conclusion

Academic identity has a vital role in the performance of students. Hence, according to the proven effect of physical context on the identification process, the aim of this study was to determine the physical factors affecting place identity in higher education students. Islamic Azad University South Tehran Branch was selected for this study and the required data were collected through 379, two-dimensional questionnaires.

The first dimension of this questionnaire evaluated students' place identity. According to the results, only less than about 20% of the students intensely lack academic identity. On the other hand, among the three selected faculties, students of Art and

Architecture have the greatest place identity, while the most of the students with low place identity are in Faculty of Sciences.

In order to examine the physical context quality from the students' point of view, the second dimension of the questionnaire evaluated the students' satisfaction with physical environment elements. For this purpose, physical factors defined in 5 clusters. The students' answers show that physical context of the Faculty of Engineering, with about 30-40% dissatisfied, has the highest quality among the three faculties. Although, it doesn't indicate an ideal condition, it shows the highest level of satisfaction in comparison to two other faculties (fig.2-7).

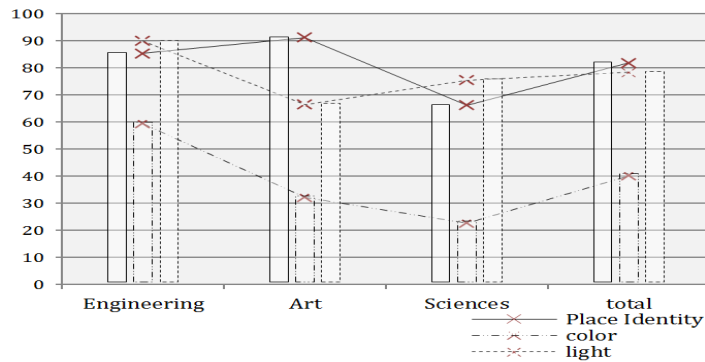


Fig. 2. Percentage of the students with minimum of average place identity& satisfaction with visual indoor factors

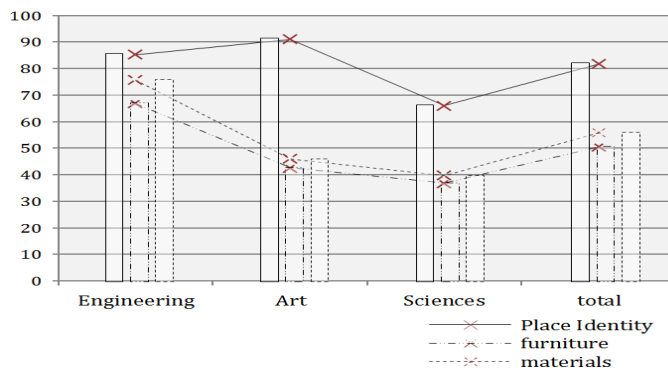


Fig. 3. Percentage of the students with minimum of average place identity& satisfaction with visual indoor-outdoor factors.

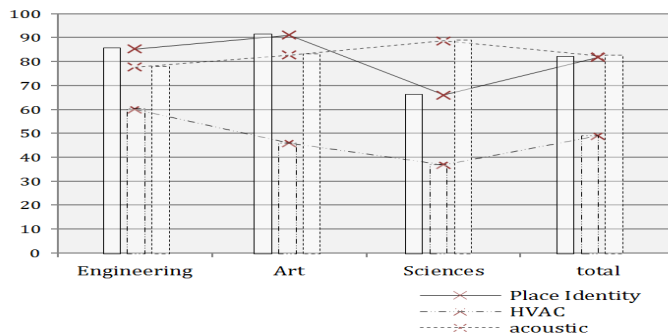


Fig. 4. Percentage of the students with minimum of average place identity& satisfaction with Sensory indoor factors

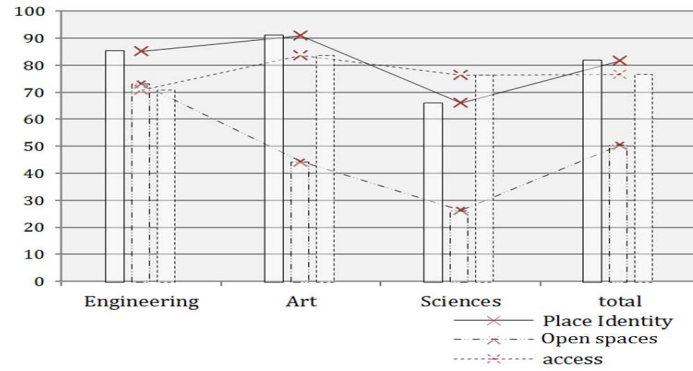


Fig. 5. Percentage of the students with minimum of average place identity & satisfaction with Sensory outdoor factors

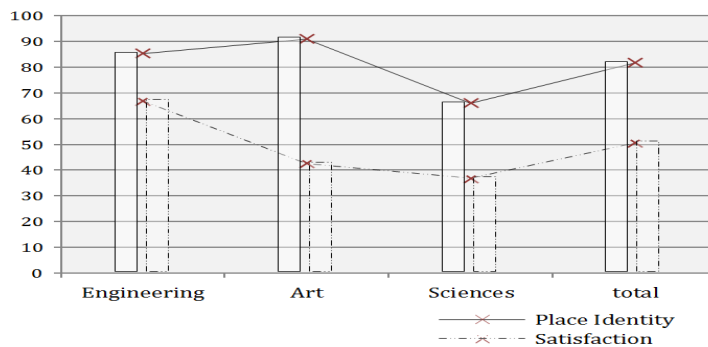


Fig. 6. Percentage of the students with minimum of average place identity & satisfaction with Sensory indoor-outdoor factors

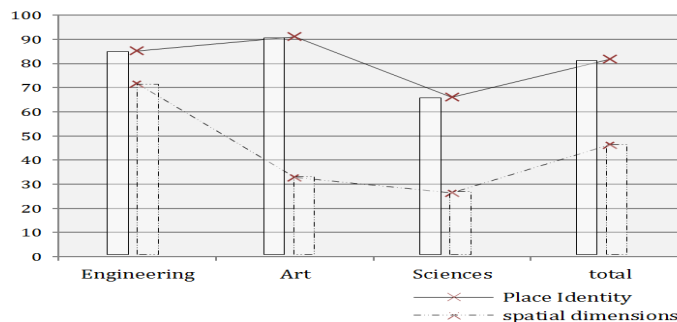


Fig. 7. Percentage of the students with minimum of average place identity & satisfaction with physical context

Detailed analysis of each physical item reveals that the Engineering students have the most level of consent with every physical factor, except acoustic conditions (fig. 4). Besides, high level of consent with lighting (only about 10% not satisfied), (fig. 2) means that interior spaces of this faculty benefit from appropriate natural and artificial lighting. Moreover, this indicates that outdoor spaces are also well illuminated at nights.

In contrast, more than 60% of dissatisfaction in the Faculty of Sciences illustrates the low quality of its physical context. The 70% discontent of these students with open space and spatial dimensions infers that they intensely lack both indoor and outdoor space. In fact, students of this faculty have the least satisfaction with every physical factor except lighting and acoustic conditions.

Surprisingly, students of Art and Architecture, despite their high level of place identity, rated the quality of physical factors almost similar to the Faculty of Sciences (with nearly 5% less discontent).

Their greatest problem seems to be the lighting as they evaluated it weaker than two other faculties. The good thing about this faculty seems to be the quality of access with less than 20% discontent.

Comparing the results in different faculties shows that high level of satisfaction with physical context doesn't necessarily result in increased sense of place identity; as the faculty with not much general satisfaction seems to have the most place identity (fig7). It means that not all the physical factors positively affect place identity and recognition of the effective factors needs more precise investigation.

In order to derive accurate results, the correlation between quality of physical factors and students' place identity have been examined. Table 14 demonstrates the derived results from testing each factor. According to this chart, all the examined physical attributes, except acoustic conditions, access to public transport and intrusive reflections positively correlate with students' place identity.

After testing the hypotheses, the independent variables with significant correlation (variables with p.value more than 0.05) were entered the regression model for defining the most effective factors.

The regression model implied that green space, illumination, ease of access and thermal conditions of interior spaces, are the most important physical factors influencing place identity. On this basis, high place identity in Art students is rooted in their great satisfaction with the access quality. Moreover, lack of green space explains the weak sense of place identity in Faculty of Sciences.

According to the findings, some suggestions are presented as below:

1. In the design process of higher education environments, it is necessary to devote an adequate area to green space.

2. It is essential to consider the illumination of each specific space in the design process and provide adequate light for spaces, based on their function, size and duration of time spent there.

3. It is necessary to contemplate the accessibility while locating the campus.

4. Due to the individual differences, no same ideal thermal condition exists for everyone. Hence the inability to control these properties would be harmful on students' perception of place. So, besides contemplating bioclimatic design considerations, the controllable windows and air conditioning systems are suggested. Mentioned suggestions help both designers and university managers to promote academic level of university by increasing the academic identity of the students.

Table 14  
Hypotesis result test

Physical Factors	Faculty	Result			
<b>H1: Sensory Indoor Factors Correlation with Place Identity</b>	<b>Color</b>	Suitability of Colors	Accepted		
		Adequacy of Color	Accepted		
		Total	Accepted		
	<b>Light</b>	Adequacy of Light	Accepted		
		Reflection on Board	Rejected		
		Adequacy of Natural Light	Accepted		
		Night Lighting	Accepted		
		Total	Accepted		
		Comfort	Accepted		
	<b>H2: Visual Indoor- Outdoor Factors Correlation with Place Identity</b>	<b>Furniture</b>	Adequacy	Accepted	
Interaction Suitability			Accepted		
Course- Type Suitability			Accepted		
Total			Accepted		
Floor Covering			Accepted		
<b>Materials</b>		Wall Covering	Accepted		
		Ceiling Covering	Accepted		
		Total	Accepted		
<b>H3: Sensory Indoor Factors Correlation with Place Identity</b>	<b>HVAC</b>	Thermal Condition	Accepted		
		Indoor Air Quality	Accepted		
		Total	Accepted		
	<b>Acoustic</b>	Sound Reflection In Classroom	Rejected		
		Exterior Annoying Noises	Rejected		
		Total	Rejected		
		Adequacy Of Green Space	Accepted		
<b>H4: Sensory Outdoor Factors Correlation with Place Identity</b>	<b>Open Space</b>	Appropriate Places For Rest	Accepted		
		Adequate Restrooms	Accepted		
		Way finding Signage	Accepted		
		Total	Accepted		
		Open Space Location	Accepted		
	<b>Access</b>	Ease of Access	Accepted		
		Public Transport Access	Rejected		
		Total	Accepted		
		<b>H5: Sensory Indoor- Outdoor Factors Correlation with Place Identity</b>	<b>Spatial Dimensions</b>	Classroom	Accepted
				Open Space	Accepted
Corridor And Staircase	Accepted				
Library	Accepted				
Workshop And Laboratory	Accepted				
Amphitheater	Accepted				
Praying Room	Accepted				
Student Self-Service	Accepted				
Computer Lab	Accepted				
Total	Accepted				

## **APPENDIX (QUESTIONNAIRE)**

### **Survey Response Scale (5 point scale):**

Strongly Agree - Agree - Neutral - Disagree - Strongly Disagree

#### **Q1: Place Identity**

1. Studying at this University says a lot about who I am.
2. I can really be myself at this university.
3. This university means a lot to me.

#### **Q2: Satisfaction with Physical Dimensions of Place**

##### **• Color**

1. Colors used in the interior of the university fit their function.
2. Sufficient amount of color has been used in interior spaces.

##### **• Lighting**

1. Interior spaces have adequate lighting.
2. Light reflection, makes it hard to see what is on the board.
3. Windows provide an appropriate amount of light for the classes.
4. The outdoor lighting at night is appropriate.

##### **• Furnishing**

1. Class furniture is in such a way that I feel comfortable when sitting in class
2. There are sufficient numbers of benches in the yard.
3. Class layout easily enables interaction between teachers and students.
4. Layout and type of furniture fit type of the class.

##### **• Open space**

1. There is sufficient amount of green space.
2. Places with shade are considered for relaxing.
3. There are sufficient numbers of restrooms.
4. Appropriate signage has resulted in easy way finding on the open space.

##### **• Indoor Air Quality**

1. Temperature range of the classes is in favorable condition.
2. Indoor air is fresh and doesn't cause boredom.

##### **• Acoustic Conditions:**

1. Sound reflection in the classrooms results in its low clarity.
2. External noises disturb the focus in the classroom.

##### **• Spatial dimensions**

1. Class size is proportional to the number of the students.
2. Outdoor area is proportional to the number of the students.
3. Corridors and stairways capacity is sufficient for all students to move without crowding.
4. Library area is proportional to the number of students.

5. Labs and workshops area is proportional to the number of the students.
6. Amphitheater area is proportional to the number of the students.
7. Prayer room area is proportional to the number of the students.
8. University self-service area is proportional to the number of the students.
9. Computer labs area is proportional to the number of the students.

##### **• Access**

1. University location is appropriate.
2. There is easy access to the University.
3. The University has convenient access to public transportation.

##### **• Materials**

1. Materials used for interior/exterior flooring are suitable.
2. Materials used for covering interior/exterior walls are suitable.
3. Materials used for covering ceilings are suitable.

## **Acknowledgment**

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