

## An assessment of pedestrian networks in accessible neighborhoods: traditional neighborhoods in Iran

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### Abstract

Accessibility is one of the important factors in public open space design and the creation of equitable neighborhoods. Limitations caused by physical disabilities should not be a barrier for accessing desired spaces and people must be able to live with the greatest possible independence regardless of mobility limitations. The purpose of this paper was to identify the inclusive criteria of pedestrian design and explore the physical characteristics of equitable neighborhoods in Iranian cities. People who experience disabilities have equal rights to have access to the physical environment, communication devices and different services for education, recreation, social participation, accommodation, health and employment. This study was based on the analysis of the morphological characteristics of the Iranian traditional towns (Yazd and Nain), the socio-historical information, and the direct observation of the spaces, and interviews. The findings of the research showed that social equity and shaping an inclusive community are among the problems of developing countries. Based on the findings related to physical limitations of people with special needs and their attitude toward the varied problems they face, some key solutions have been proposed to guarantee better independent movement and achieve equity of access. People with disabilities should be equal to others in terms of their access to urban spaces, regardless of gender, ethnicity and type of disability. Safety and convenience are some ways for promoting public health especially its mental aspects. Finally it can be said that inclusive pedestrian networks will provide the people especially those suffering from physical disability and moving limitations with more accessible routes and help them participate in personal and social spheres of life more effectively.

Keywords: Equitable environment, Accessibility, Pedestrian network, Inclusive design

### 1. Introduction

Studies in the field of public spaces cover different scales, from neighborhood units [1] to the national level [2] and include a broad range of public spaces including access to green space [3,4], access to recreational services [5,6], and access to open spaces [7]. Designing neighborhood with open spaces is about giving people genuine involvement and real participation in shaping and developing their communities and neighborhoods [8].

During the Cities Project (Cities Aspects and

Multidisciplinary Methods of Analysis in Arid Regions) the authors had the opportunity to visit and study several examples of urban fabric in Iranian cities in order to explore the spatial functional structure underlying an apparent diversity in the organization of such traditional cities [9]. Vernacular cities have certain characteristics that can be summarized as follows: they are fully integrated to and respect both their natural and socio-cultural contexts. They are the most significant expressions of the common values of a society and the result of a certain vision of the world and a defined life style [10]. In traditional architecture we may find differences and variations, but they are all integrated to a unified system and follow a general order; they use common vocabulary which is well known to the people living in a similar culture; these norms are usually transmitted from generation to generation. These variations are adapted to answer to a common culture or a common functioning system. "Equity" or fairness is concerned with the "fairness in mobility and accessibility levels across race, class, gender and disability." Furthermore, Sanchez et al. [11] noted that the aim

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of equity is "to provide equal access to social and economic opportunity by providing equitable levels of access to all places." Access management techniques have a role to play in achieving equality of mobility.

Various physical barriers may prevent people such as the disabled, the elderly, those with young children in pushchairs, pregnant women, etc., from using public pedestrian networks. Maintaining equity in citizen's access to these networks has always been considered and practiced in different situations from long ago, but it has not been done with complete harmony. Reconsideration of urban design in organic cities and many villages especially those which are not easily accessible reveals the valuable lessons in providing access to spaces. It can be said that in traditional cities, appropriate places have been designed as the passages for the elderly and people with mobility problems, and the vehicles that might be used by such people were important in determining of dimension and size of the paths. People with disabilities should not be prohibited from participation in their chosen recreational, social or employment activities because of architectural or attitudinal barriers. The barriers for the participation of people with disabilities in society are nowhere more clearly seen than manmade environments. The disabled must be able to live with the greatest possible independence regardless of their limitations and far away from stress caused by constraints that usual people are free from.

The quality of the living places, quality of life and social structure interact with each other. Significant developments in the quality of the environment will affect life positively, and the improvements in quality of life will consequently influence the quality of space. This interaction will increasingly take part in the formation of a quality-sensitive life culture [12]. There are two main models of disability. The 'medical model' defines it in terms of a medical condition (e.g. a person is 'arthritic' or 'epileptic'); in this type the disabling factors are placed on the individual, without reference to social context. The 'social model' focuses on the barriers imposed by a disabling society/environment which is unable to make adjustments: this, rather than personal impairment, is the disability factor. In this model, people have impairments and it is the environment which is functioning as the disabling factor [13]. Architects and urban designers work with a concept of space that influences the idea of living environments whose quality directly affects peoples' expectations. Accordingly, the practicality and capability to meet the users' needs, and, therefore, the space's utility are the important indicators of the spatial quality. Design of accessible spaces for all people is a challenge of experts, including architects, urban designers, furniture and product designers should consider the wide group of individuals. The continuum covers individuals with limited physical ability, sentimental handicapped (blinds, weak-sighted, deaf, and semi-deaf) and people of various physical and movement capability (elderly people, children, women and so on) as well as usual people and individuals who may be disabled in some other ways.

In developing countries, in spite of some governmental organizations' tendency towards enhancing the accessibility and usability of spaces, there is no special attempt to develop inclusive designs that can satisfy the needs of the majority. The

most usual aspect of the handicapped is their disability regarding physical movements. Inclusive design for people with mobility limitations happens on the surface of the environments but could provide equity in access which will have extraordinary positive mental effects, in addition to creating a sense of physical and sanitary security. Today accessibility for all is recognized as a basic necessity and there are attempts all over the world to make it a reality.

Inclusive design has specifications, characteristics and principles that distinguish it from ordinary design. Urban spaces can be accessible for a wide spectrum of people only if their design is appropriate and optimized. In this way spaces can adapt to the needs of all people with any level of moving disability, any age or any physical condition. In fact, inclusive urban space responses to the requirements of disabled people, increases their physical independence and decreases their need to receive help from others.

## 2. Hypothesis and objective

The form of traditional cities is determined by several socio-cultural factors which could be considered as primary forces, whereas physical aspects are mostly generator of variants and could be considered as changeable secondary factors. The form of a city could hardly be understood outside of its context, the culture or life style of the society in which it is shaped. This paper seeks to answer questions about the logic by which traditional neighborhood spaces respond to needs of all people and the potentials offered by their spatial structures. The hypothesis in analyzing their layout is that these cities are able to adapt to the socio-cultural norms of certain societies and that they could be shaped to respond the social needs and to produce appropriate behavior. This study is based on the analysis of the morphological characteristics of the layouts of several traditional cities, the socio-historical information, and the direct observation of the spaces and face to face interviews with citizens especially those having moving limitations. The main objective is to explore the following questions:

- 1) How are pedestrian networks "designed" to fulfill users' social needs?
- 2) How architectural settings in the neighborhood spaces are "coded" or "structured" to produce appropriate social practice or behavior?

The objective of the study in which the survey, observation and photographic methods were used, was to examine the neighborhood spaces providing individual and social benefits to people and to determine the principles regarding the establishment of this space. 291 respondents participating in the survey were asked about the neighborhood spaces and alleys they use in everyday life, the qualities of the routes' networks, their purposes for using these spaces, and a descriptive analysis was performed to determine the route's quality.

## 3. Norms and methodologies

In any city, or architectural project there are two active human entities that interact with spaces, the physical body

with its basic needs, dimensions, requirements for comfort and the social hidden body with all its psychological and socio-cultural needs that may differ from one society to another and from one period of time to another. The social body has to do with all the norms and codes that are defined or considered by the society, while moving in the street, using a public facility, interacting with neighbors etc. In the Islamic world these codes may appear as strict laws that govern the behavior of people.

The social body requires a certain environment that should be designed to promote psychological and social well-being that go along with these codes, such as having the opportunity to move from one place to another if needed, to interact with others or to have privacy, to feel secure and safe, to be in an interesting environment with aesthetic attributes, and many other conditions that permit the soul as well to the body to feel in harmony with the world and the physical environment. Research on the interrelations and mutual links between forms and behaviors seeks to answer questions about the mechanisms and rules by which buildings are constructed to fulfill social needs. The potentials and the physical characteristics of spaces that are defined by their spatial structure give people different options of use and in some cases they could force certain social behaviors. In this regard, we could explain some psychological acts, behaviors or emotions by looking outward and investigating the physical surrounding.

To evaluate the equity of social access, a survey was applied and the following qualities related to neighborhood spaces were determined in parallel to the data obtained through the review of the literature:

- User's behaviors, needs, and expectations
- Equipment/accessories in the routes, and their qualities
- Sensory effects on the users in their preferences of neighborhood spaces

The users of these cities were surveyed through the questionnaire using Likert scale in order to evaluate their opinions, and adjective scales were used to obtain the impression of the users' reaction to some aspects of the physical environment which provides important input for the description of the users' perceptions related to the spaces. The analysis was conducted through descriptive statistics to determine the functions of the neighborhood spaces and their quality, which might also reveal the negative attitudes and exigencies of the respondents.

The quality of the components was divided into five Likert scale categories: very good, good, normal, bad, very bad. The formula of Gap width = series width / number of the group is the grading scale for comparing the arithmetic averages of the Likert-type scale.

The result was calculated as  $4/5=0.8$  for the Likert-type scale of five. The gap widths of the scale are shown in Table 1, and the results were analyzed according to these values. The average of the participants' answers was taken as the representative of their attitude toward the neighborhood spaces and their spatial quality .

The questionnaire asked basic demographic questions about participants' age and gender, and the nature of their disability. It was also designed to gather data on participants' current city

**Table 1.** Gap Widths of Quintet Likert Scale (Source: Authors)

Item	Item description	Score range
5	very good	4.21-5.00
4	good	3.41-4.20
3	moderate	2.61-3.40
2	bad	1.81-2.60
1	very bad	1.00-1.80

If the value is  $\leq 2.60$  the quality is bad.

If the value is  $> 3.40$  the quality is good.

conditions and future city needs.

At the end of this study, two main components determining the space's quality were found: (i) Qualities of the physical environment (location of alleys, its relation with the surrounding structure, pedestrian / vehicle relation in terms of accessibility, fixed elements / equipment in the area, quality of landscape accessory) (ii) User characteristics comprised two quality criteria: (a) the behavioral and functional quality, (b) the visual quality.

#### 4. Accessible environments

The use of public facilities can be linked to accessibility, and thus residential proximity to facilities and services can be theorized as contributing to health and well-being in a number of ways [14]. Accessibility is a key element of the public realm. While the public realm should be accessible to all, some environments are less accessible to certain sections of society. Accessibility can be discussed in terms of management of the public realm (i.e. prevention of undesired social behavior). Managers and owners of quasi public spaces have various motives for controlling activity such as their responsibility for maintenance, liability for what may happen within the space, and concern for marketability. The design of the neighborhood environment can be considered in terms of the ways in which it reduces the choices available to certain social groups, such as those with disabilities, women and the elderly, and those without access to cars and reliant on walking or public transport. Unsurprisingly, people with disabilities are often alienated from the built environment, as well as from the social and developmental processes underlying it. In such a context, features for the less able-bodied people in society are regarded as 'add-ons', an extra cost to be resisted [13,15]. Accessibility - meaning the existence of democratic venues that can be made use of by anyone, regardless of any physical, sensorial or cognitive limitations - consists of a process that is implemented in a sequence of stages.

The process begins with the perception of the need to ensure social inclusion, followed by decisions to put it into practice. Next, specific social measures must be taken based on the realization that it is essential to structure a legal framework that emphasizes equal opportunities. The process should also include other less theoretical aspects concerning the various technical areas. The space shows a chaining joint structure starting from the inner doors of our building and extending to the urban spaces and natural areas surrounding the city. One of the most important links of this chain is composed of the urban spaces in which the human-nature

relations increase to ensure the integration with the natural environment and to meet the biological, physical, and psychosocial needs of the citizens. While the spaces designed with respect to users' needs in mind are frequently adopted and owned, the spaces not adopted or owned are unused, neglected and changed over time. The evaluation of the living environment in relation to the users is important for sustaining the livability, and the data obtained after the evaluation provides input for the planning and design studies. The design evaluation is concerned with assessing the effectiveness of the designed environments for the users; such environments could have an important influence on the human experience [16]. They can facilitate activities, create a mood or feeling, and relieve or create human tension and stress. Generally speaking, the designed environments can maintain users' satisfaction and happiness and promote the effectiveness of their activities [17].

## 5. Neighborhood Space quality

Neighborhood space in many contemporary residential communities, particularly in Third World countries, often has the appearance of no man's land. This is because public space in the contemporary city, in all its tidiness, is thought of as a secondary space, owned neither by the city nor by the individuals. It does not invite one to be or remain there [8]. The urban pattern is composed of roads, buildings and spaces. When these components, as elements of the physical environment, are taken into consideration in terms of the concept of space and structured environment, they may be defined as the environment's utility for individual and social uses. Rapoport [18] stated that these environments have several components, and the structured environment is composed of fixed (infrastructure and buildings), half-fixed (outdoors: trees, boundary elements, lighting elements, benches etc.) and non-fixed (users, user actions and vehicles) elements. Half-fixed components are the important determinants of the environment's influence on user attitudes. The outdoor spaces are shaped with fixed and half-fixed components in relation to the user needs in the scope of physical environment. The quality of the outdoor spaces formed by the components coming together is a type determiner for the quality of life. The urban spaces support the relationships between people and increase the quality of social life [19]. Also, Mitchell [20] defines health, security, physical environment, personal development and community development as components that contribute to a better quality of life. Kamp et al. [21] considered that the synonymously used concepts like quality of life, environmental quality, and livability were related to the areas of specialization like planning architecture, public engineering, public health and policy.

While the important elements of quality principles were livability, connection, mobility, personal freedom and diversity, the physical form criteria were categorized under community, urban block, buildings, streets, pedestrian pavements, open space, vegetation and feature areas. This extensive list of physical form criteria was put together with respect to the quality of the community. The examples of

strong elements are open space areas, outdoor amenities and "walkability" which correspond to active or passive outdoor spaces supported by a pedestrian circulation network. A large portion of this research has focused on walking. Walkability has been identified as an important component of accessible, equitable and livable communities [22]. Dober [23] stated that the functional, convenient, safe, nice, exhilarating experiences of a city user who goes from one space to another were the desired qualities for a good landscape order. Availability and utility, aesthetic attraction, fluency between inner and outdoor spaces, suitability for the realization of activities, safety, variety in use and convenience for every user of the outdoor spaces were described as the principles of spatial quality. Indeed it can be said that pedestrian networks have two main functions; they are a part of transportation system in the city and provide access to different functions, and also acts as a neighborhood space are as follows. Some of the characteristic of these networks are as follows:

- Continuity:

Pedestrians need a connected network that joins all origins to all destinations without any interruption and disconnection. There are certain criteria for the continuity of pedestrian networks. The networks must have an appropriate design so that the pedestrians can easily the driving lanes; they should be used by drivers or vehicles and bicycles; they have to make suitable floor for sidewalks; and finally they better not be cut by bridges or natural obstacles.

- Safety:

The safety of routes is one of the main requirements of pedestrians. With regards to safety some factors can be mentioned such as: Separation of the routes for cars and pedestrians, continuity of pedestrian routes, safe pedestrian routes and absence of bumps, stairs and pits on them, supplying enough light for the routes, and covering the uncovered gutters. One of the important issues of the world from the human safety viewpoint is the safety of human communities. This collective movement that most countries especially developing countries have joined so far, has been defined and designed by World Health Organization for promotion of human safety level. Thus paying attention to the safety of citizens and at least from physical and equipment safety viewpoint is important and should be taken into consideration in urban and architectural design.

- convenience:

Some of convenience criteria of routes are as follows: Having appropriate slope, having a firm, smooth, non-slip and even surface, sufficient width of sidewalks regarding their traffic rate and accumulation of surface waters. Pedestrians are very sensitive to the distances and generally select the shortest route; better routes but longer ones are less used by them [24].

When the requirements of pedestrian roads are described and realized, the level of the equity will become more clearly observed. Determining the needs and behaviors, meeting user expectations, and arranging the spaces for their needs will aid in assessing the spatial qualities (Table 2).

Besides the positive effects on physical, mental, and social health, the participation in outdoor activities also increases self-confidence and self-respect, leads to positive changes in personal skills, social behaviors, body and personality



**Table 2.** Requirements of pedestrian routes (Source: Authors)

Continuity	Safety	Convenience
a) Not intersections between pedestrian and vehicle roads	a) Separation of the routes for cars and pedestrians	a) Having appropriate slope
b) Making Suitable floor for sidewalks	b) Supplying enough light for the routes	b) Sufficient width of sidewalks
c) Not cutting the routes by obstacles	c) Covering the uncovered gutters	c) Shorter routes

development, and general behaviors [25]. People use outdoor spaces for learning, discovering, examining and researching.

There is a strong relationship between the quality of the outdoor spaces and the activities carried out in these spaces; therefore the quality of the outdoor spaces either supports or negatively affects the activities performed in those spaces. The outdoor activities were divided into three parts by Gehl [26]: (i) necessary activities, (ii) optional activities and (iii) social activities. When outdoor areas are of poor quality, only strictly necessary activities occur, and if the quality of the outdoor spaces is good, optional activities will occur with an increasing frequency. Furthermore, as the levels of optional activities rise, the number of social activities usually increases substantially.

## 6. Equitable Access in Traditional Neighborhoods

Pedestrian routes are a part of neighborhood communication networks which originally provide access to urban residential spaces. In the traditional cities people generally traveled on foot. Speed was not as yet an important factor in transportation; therefore, the two different types of roads and routes of communication were not distinguished. Alleys and narrow streets within the residential districts were used for semi-public functions. In fact, routes performed other and more extended functions.

With relation to design and construction of traditional neighborhoods, examples of inclusive design which have roots in Islamic ideology can be observed in urban environments. For instance sitting platforms (Pîrneshîn), slope surfaces of roads and alleys have been measured in order to help people who are physically restricted (Fig. 1). It would be apposite to

refer to examples of textures of Iranian cities. These examples are set out to demonstrate the inclusion of urban spaces from different aspects. They are about the desert villages, Abyaneh, and Masouleh.

- Abyaneh is a famous historic Iranian village near the city of Kashan in Isfahan Province. This village is located in a rather deep valley and close to high and approximately upstanding walls of a mountain. Position The village textures are posited in a linear form. Being situated in a mountainous area, it has taken some special architectural features. Communicational routes in Abyaneh are designed with slopes because of regional mountains. Steep slope of the village in the foot of the mountain has given a special form to buildings and routes. Due to this steep slope, buildings are constructed with different levels by using routes that are situated on different levels (Fig. 2). Buildings are built in a way that eases the citizens' movement in different seasons.

- Masouleh in the North of Iran demonstrates the uniqueness of the traditional texture. In this village architectural elements and local materials created a unique homogenous environment, a combined texture of houses and buildings with nature and culture. The village, built on a steep slope of a mountain, has used this natural slope in the best way.

The natural sloping condition of Masouleh affected the building forms and routes. The buildings have been built into the mountain and are interconnected. These buildings mostly have two or three stories (1st floor and a lower one) and the buildings can be accessed from the upper and lower levels. Through sloping routes and without using any stairs, village residents are led from the lowest point of the village to the highest. But in some parts, two levels are connected with some stairs to help the people that prefer fast accessibility. Because of the sloping site of the village, the routes inside the village lie on the roofs of the lower houses in order to provide access to different spaces (Fig. 3). In fact courtyards and roofs both serve as pedestrian areas similar to streets. A walk around village is very pleasant. The small streets and steep slope do not let vehicles enter the village spaces. It is the only village in Iran with such a prohibition.

In entrances of traditional buildings, there are some platforms called Pîrneshîn which is a communal space for neighbors to gather and speak to each other. Furthermore, Pîrneshîn is a place to be used as a sitting and resting space for elderly persons and people tired due to carrying heavy loads.



**Fig. 1.** Platforms (Pîrneshîn) at the entrance of buildings and routes in desert villages.



**Fig. 2.** Routes in Abyaneh



Fig. 3. Routes on the roofs of houses, Masouleh

In side surfaces of many routes that were built for providing access to residential spaces, some platforms were made so people could regain their power when tired. This phenomenon promoted social activities in addition to the communicational activities as the most important functions of urban spaces. Face to face communication of the people that used to exchange information and thoughts when visiting was the social activity in routes and alleys that could form a part of people's leisure time.

### 7. Findings

During the field study, investigations were carried out in order to check whether neighborhood spaces are accessible for all people. Of the 291 respondents who answered this question, the age range was 14 to 84. Of these respondents, 91 were under 40 years of age (31%), 143 between 41 and 60 years of age (49%), and 57 were 61 years of age or older (20%) (Fig. 4).

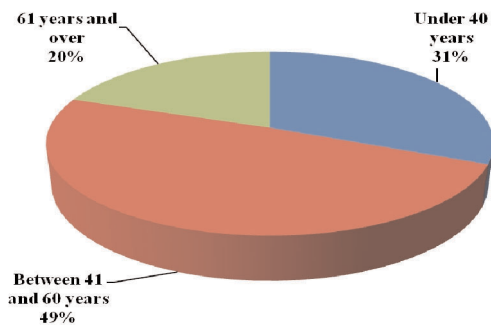


Fig. 4. Age of Respondents (Source: Authors)

Respondents' gender make-up was 166 males (57%) and 125 females (43%). With regards to the nature of disability, 71 respondents had a physical disability (24%), 17 were visually impaired (6%), 6 were hearing impaired (2%), 17 had psychological disabilities (6%), and 14 had other disabilities, such as learning disabilities (5%). Additionally, 15 reported having multiple disabilities (5%). Sixty-four respondents used mobility aids (22%), while 227 did not use aid of any kind (78%). Of those who did, 6 used scooters (9%), 5 used crutches (8%), 7 used canes (11%), 43 used wheelchairs (67%), and 3 used white canes (5%) (Fig. 5).

When the users were asked for what reasons they use the neighborhood spaces and alleys, it was determined that they mostly prefer the area for speaking, meeting with friends, and performing the social activities. Eighty percent of the respondents reported that they arrive to the urban spaces comfortably, whereas 35% indicated that there was no appropriate pedestrian pavement leading to the routes, and 39% stated that the pavements frequently intersecting with the vehicular roads make walking difficult. The results showed that continuity of the routes was considered as "good." Nearly 58% of the respondents considered that the general appearance of neighborhood spaces is moderate ( $=3.21$ ). The respondents evaluated the quality of the space's convenience, tidiness, safety, and order as "moderate" (Table 3). The general evaluation over the averages is "moderate" with the value of  $=3.12$ .

The qualities of the neighborhood spaces were determined primarily in terms of general appearance and sensory effects on the user. The appearance of the neighborhood spaces is considered to be an important factor in the space's attraction

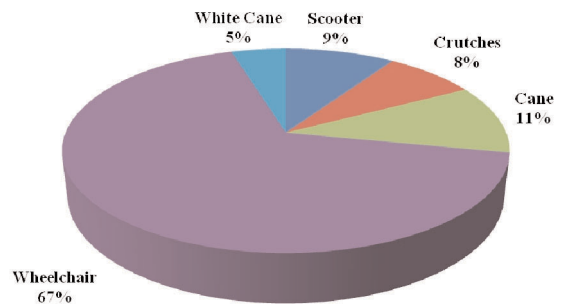


Fig. 5. Mobility Aids (Source: Authors)

Table 3. Respondents' Opinions about the neighborhood's General Appearance. (Source: Authors)

	Very bad		Bad		Moderate		Good		Very good		$\bar{X}$	S
	f	%	f	%	f	%	f	%	f	%		
What is your opinion about the general appearance of the neighborhood spaces?	17	5.8	22	7.6	169	58.1	50	17.2	33	11.3	3.21	0.96
Continuity	11	3.8	24	8.2	78	26.8	128	44.0	50	17.2	3.62	0.89
Convenience	20	6.9	37	12.7	94	32.3	114	39.2	26	8.9	3.30	0.89
Safety	32	11.0	57	19.6	105	36.1	80	27.5	17	5.8	2.97	0.98
Tidiness	41	14.1	66	22.7	101	34.7	62	21.3	21	7.2	2.85	1.08
Order	36	12.4	74	25.4	108	37.1	57	19.6	16	5.5	2.80	0.99
General evaluation											3.12	0.54

and inviting quality. Users cited the sensory effect as their reason for preferring the space. The neighborhood was examined with this criterion and the results presented in Table 4 were obtained.

The survey asked for the respondents' opinions regarding the quality of the routes in the neighborhoods. The landscape elements in the open spaces are the half-fixed components that provide the spatial quality. The individual quality of the landscape accessories that animate the space is accepted as the determining element of the total quality. 42.6% of the respondents rated the ground covering, 35.4% rated the lighting elements, and 33.0% rated the width of sidewalks as "moderate." Moreover, sitting elements and slope of routes were considered as "moderate" and quality of the green was assessed as "good" (Table 4). The general evaluation of the quality of routes was found to be "moderate" with a value of =3.19.

## 8. Conclusion

The findings of the research showed that social equity and shaping an inclusive community are among the problems of developing cities. It is evident that by fulfilling purposive fundamental measures neighborhood space as one of the chains of equity provision can become more inclusive. The aim of improving the quality and quantities of public open spaces used by each group of people who are in different ages, genders and occupations, is upgrading the users' life quality. This can be done by equipping these places with various functions; all of these are intended to make the urban life more attractive and meaningful by creating livable environments. People who experience disabilities have equal rights to have access to the physical environment, communication devices and different services for education, recreation, social participation, accommodation, health and employment. Equitable opportunities for all people are critical to the development of modern neighborhoods in towns and cities.

Continuity, safety and convenience are the main inclusive design criteria that can determine the physical characteristics of an equitable environment in accessible urban neighborhoods. Within the neighborhood one can easily find one's way and accessibility is generally good. Paths follow gentle slopes, allowing easy movement for people using wheelchairs. People with disabilities should have equal access to urban spaces, regardless of gender, ethnicity, type of disability and when the disability was acquired. All people,

including those with disabilities, have the right to live in an inclusive community where they are able to make the most of their talents and abilities in learning, training and work. On the other hand, providing citizens' safety and convenience is a way for promoting public health level especially regarding the mental aspects. Maintaining safety and security can indirectly decrease hazards. Finally it can be said that by inclusive pedestrian networks, neighborhood spaces can be accessible for the people especially with physical and movement limitation and help them participate in the individual and social aspects of life.

## References

- [1] Larsen, K. and Gilliland, J. (2008) 'Mapping the evolution of 'food deserts' in a Canadian city: supermarket accessibility in London, Ontario, 1961-2005', *International Journal of Health Geographics*; 7 (16), doi:10.1186/1476-072X-7-16.
- [2] Pearce, J., Witten, K., Hiscock, R. and Blakely, T. (2008) 'Regional and urban-rural variations in the association of neighbourhood deprivation with community resource access: a national study', *Environment and Planning A*; 40, pp. 2469-2489.
- [3] Coutts, C. (2008) 'Greenway accessibility and physical-activity behavior', *Environment and Planning B*; 35, pp. 552-563.
- [4] Hillsdon, M., Panter, J., Foster, C. and Jones, A. (2006) 'The relationship between access and quality of urban green space with population physical activity', *Public Health*; 120, 1127-1132.
- [5] Robitaille, E. and Herjean, P. (2008) 'An analysis of the accessibility of video lottery terminals: the case of Montréal', *International Journal of Health Geographics*; 7 (2), doi:10.1186/1476-072X-7-2.
- [6] Diez Roux, A., Evenson, K., McGinn, A., Brown, D.G., Moore, L., Brines, S. and Jacobs, D.R. (2007) 'Availability of recreational resources and physical activity in adults', *American Journal of Public Health*; 97, pp. 493-499.
- [7] Witten, K., Hiscock, R., Pearce, J. and Blakely, T. (2008) 'Neighborhood access to open spaces and the physical activity of residents: a national study', *Preventive Medicine*; 47 (3), pp. 299-303.
- [8] Abu-Gazzeh, T.M. (1996) 'Reclaiming public space: the ecology of neighborhood open spaces in the town of Abu-Nuseir, Jordan', *Landscape and Urban Planning*; 36 (3), pp. 197-216.
- [9] Bagheri, M. and Norouziyan Maleki, S. (2009) 'Equity of Social Access in Construction of Traditional Iranian Cities and Villages', *LIVENARCH 4th international congress*, 9-11 July, Trabzon, Turkey, *Proceeding Vol. 2*, pp. 603-615.
- [10] Rapoport, A. (1977) *Human Aspects of Urban Form: Towards a Man-Environment Approach to Urban Form and Design*,

**Table 3.** Respondents' Opinions about the neighborhood's General Appearance. (Source: Authors)

	Very bad		Bad		Moderate		Good		Very good		$\bar{X}$	S
	f	%	f	%	f	%	f	%	f	%		
Sitting elements	34	11.7	69	23.7	110	37.8	48	16.5	30	10.3	2.90	0.96
Ground covering	18	6.2	44	15.1	124	42.6	59	20.3	46	15.8	3.24	0.90
Lighting elements	33	11.3	59	20.3	103	35.4	60	20.6	36	12.4	3.02	1.01
Slope of routes	25	8.6	35	12.0	77	26.5	111	38.1	43	14.8	3.38	0.98
Quality of the green	16	5.5	25	8.6	80	27.5	124	42.6	46	15.8	3.55	1.08
Width of sidewalks	27	9.3	67	23.0	96	33.0	69	23.7	32	11.0	3.04	1.09
General evaluation											3.19	0.62

- Pergamon Press, Oxford.
- [11] Sánchez, T.W., Stolz, R. and Ma, J.S. (2003) *Moving to Equity: Addressing Inequitable Effects of Transportation Policies on Minorities*. Cambridge, MA: The Civil Rights Project at Harvard University.
- [12] Aydin, D. and Ter, U. (2008) 'Outdoor Space Quality: Case Study of A University Campus Plaza', *Archnet-IJAR*; 2 (3), pp. 189-203.
- [13] Carmona, M., Heath, T., Oc, T. and Tiesdell, S. (2003) *Public Place, Urban Spaces*. Architectural Press.
- [14] Pearce, J., Witten, K. and Bartie, P. (2006) 'Neighbourhoods and health: a GIS approach to measuring community resource accessibility', *J Epidemiol Community Health*; 60, pp. 389-395.
- [15] Imrie R. and Hall, p. (2001) *Inclusive Design: Designing and Developing Accessible Environments*, Spon Press, London.
- [16] Sanoff, H. (1992) *Integrating Programming, Evaluation and Participation in Design: A Theory Z Approach*, Avebury Publishing, London, UK.
- [17] Sanoff, H. (1990) *Participatory Design Theory and Techniques*, College of Design, Raleigh, North Carolina, USA.
- [18] Rapoport, A. (2005) *Culture, Architecture, and Design*, Locke Science Publishing Co. Inc., Chicago, USA.
- [19] Biddulph, M. (1999) 'Bringing Vitality to a Campus Environment', *Urban Design International*; 4 (3&4), pp. 153-166.
- [20] Mitchell, G. (2000) Indicators as Tools to Guide Progress on the Sustainable Development Pathway. In: Lawrence, R.J. (Ed.), *Sustaining Human Settlement: A Challenge for the New Millennium*, Urban International Press, pp. 55-104.
- [21] Kamp, I., Leidelmeijer, K., Marsman, G. and Hollander, A. (2003) 'Urban Environmental Quality and Human Well-Being towards a Conceptual Framework and Demarcation of Concepts; a Literature Study', *Landscape and Urban Planning*; 65 (1-2), pp. 5-18.
- [22] Lo, R.H. (2009) 'Walkability: what is it?', *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*; 2 (2), pp. 145-166.
- [23] Dober, R.P. (2000) *Campus Landscape: Functions, Forms, Features*. John Wiley and Sons, New York, USA.
- [24] Hosseini, S.B. and Norouzian Maleki, S. (2008) 'The Role of Accesses in Citizens Rate of Participation and Attendance in Residential Districts', *Journal of Technology & Education*; 2 (2), pp. 125-134.
- [25] Mc Avoy, L. (2001) 'Outdoors for Everyone: Opportunities that Include People with Disabilities', *Parks and Recreation*; 36 (8), pp. 24-36.
- [26] Gehl, J. (1987) *Life Between Buildings*, Van Nostrand Reinhold, New York, USA.