

Accessibility of the old cities for the Blind-Is Nicosia walled city accessible for the blind?



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ABSTRACT

The comfortable circulation of the blind and visually impaired individuals in the city is an issue that gains importance day by day. The study aims to examine the historic city of Nicosia, located in the north of the island of Cyprus, in terms of the blind and visually impaired access. The research was carried out in two regions called Zone 1 and Zone 2. Planning principles for barrier-free environments described by the United Nations Department of Economic and Social Affairs, Division for Social Policy and Development, were used as criteria for analyzing the streets in both zones. Research findings have been shown that it is impossible for a visually impaired person to move individually without help in Kyrenia Street in Zone 1. Although the necessary arrangements for the comfortable movement of the visually impaired have been partially made in the Zone 2, it is seen that the blind and visually impaired persons are completely ignored because of the shop owners' anxiety to display their products in front of their shops, the desire of cafes and restaurants to create outdoor seating areas, the improper placement of urban furniture, and the cars parking on the pedestrianized area even on the visually impaired pathway. Similar research on the problems of visually impaired persons in city life which has been carried out in five cities in Turkey indicated that Problems such as insufficiency of disabled roads, blocking of disabled paths in front of restaurants, cafes, and shops, and illegal parking of vehicles on the paths seem to be common problems. Our research results underlined the necessary precautions to be taken in order to ensure the circulation of the disabled without problems. The necessity of proper site management and control by the local governments were indicated. The importance of providing technological developments in this area that provide comfortable circulation of the visually impaired was emphasized.

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1. Introduction

According to World Blind Union (WBU, 2019) as one of the leading global disabled people's organizations committed to work towards an increasingly accessible world for visually impaired people, approximately 6.25 billion people which is the 70% of the world population with 15% of them having disabilities, will be living in cities by 2050 (WBU, 2019). Even individuals who are not in any disability group have problems due to unplanned

urban developments, while the lives of people with disabilities, especially blind persons, are getting increasingly difficult. People with disabilities have the right to participate in urban life equally with others without feeling different from others. The needs and challenges faced by blind and partially sighted persons should be considered by the governments as obligated by the UN Convention on the Rights of Persons with Disabilities (CRPD) (WBU, 2019). Convention indicates the rights of disabled persons' by articles. For example, laws, policies, strategies, and programs should be developed enabling accessible and affordable housing; proper infrastructure allowing persons to have the opportunity to live independently should be built; accessible environment, transportation, public facilities, services and information, and communication technologies should be enabled, and precautions for safety should be taken. In order to understand what these articles mean for blind and

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visually impaired persons, the problems they face during their daily lives in urban environments should be examined first. In the literature review, part of the study of these problems and needs, the aids and technological innovations for easing their life in the city will be examined.

2. Living in cities for the blind and visually impaired people-problems needs and innovations

Blindness is defined in three categories;

- They have no perception of light.
- They can only distinguish light and darkness.
- Visual acuity is a measure of the perception of detail. For blind people, it is 20/400. Normally the full field of view covers about 180 degrees, while the field of view is less than 10 degrees.

The majority of people with visual impairments have low vision. They can use their residual vision to some extent. There are many different types of visual impairment, each with its own specific effect on mobility (Havik and Dankers, 2020). People with visual impairments may encounter physical, psychological, and economic obstacles when using urban spaces. In the context of accessibility and mobility requirements, the physical barriers faced by people with disabilities are much more than the standard workable (unimpeded) people face, and if social sustainability is seen as a primary issue, it should also be seen as a primary need (Kaplan and Ulvi, 2009). When compared to other disability groups, visually impaired people need more support to run their lives independently more than others. According to Şat and Göver (2017), the problems experienced by the blind and visually impaired people in urban life can be observed mostly in traffic, sidewalks, or urban furniture. Public transport also creates problems for visually impaired individuals. Underpasses and overpasses that are not designed for disabled people also prevent people from participating in social life. In addition to all these, sidewalk heights, ramps, and street furniture and vehicles parked on the sidewalks create many difficulties for the visually impaired people in city life. For a blind person, especially a person with complete vision loss, the biggest challenge is to navigate between places. While navigating, schedules at train stations, maps showing the city's transportation network, signs showing the right path or warnings for potential dangers, billboards of new products on the market, all of which are types of visual information one can encounter in daily life. Since access to information means autonomy, and most of this information cannot be accessed by blind people, their independence is totally blocked.

In 2003, the American Foundation for the blind conducted a study for developing criteria for livable communities for people who are blind or visually impaired by using a series of focus groups, interviews, and surveys. The criteria were; getting

around, community integration, safety, employment, education, arts and recreation, cost of living, access to services (Lewis, 2016). Among these criteria getting around, in other words, navigating between the places is a major problem for the blind as indicated before and includes crossing the roads and using signalized intersections as well. The research by Barlow et al. (2005) was conducted to investigate the safety, orientation, and independence of blind pedestrians while crossing at the complex, signalized intersections, and suggested techniques and strategies for reducing these difficulties.

Getting around the city also includes leisure, and recreational areas should also be accessible for the blind. Brooklyn Botanic Garden, which is a good example, was created in 1955. This was the first garden in the USA, which is designed for visually impaired people. The plants have been selected for fragrant or tactile qualities, and they are all nontoxic. Blind visitors to the garden are encouraged to touch and smell the plants.

There are also technological developments-smart technologies-for helping the visually impaired persons for getting around. O'dell et al. (2019) in their study "Inclusive Smart Cities" that they explained smart cities, prioritizing inclusion in urban development, described the inclusion as "The idea that everyone should be able to use the same facilities take part in the same activities, and enjoy the same experiences, including people who have a disability or other disadvantages."

O'deil et al. (2019) also informed that a joint venture established between Google and the Royal London Society for Blind People in London. In this way, individuals with visual impairments can navigate the city transportation network with signs that provide audible instructions using a smartphone app. Beacons are small transmitters placed around buildings and send real-time site information to mobile devices. These beacons can be installed in public buildings, offices, or small locations like bus stops (Jukna, 2017). Another application of beacons was in Warsaw, Poland, called "Virtual Warsaw," a smart city project. With this project, a network of beacon sensors has been developed to assist the visually impaired people to get around the city independently (WEF, 2019). Besides smartphone applications, there are navigation headsets developed for the use of blind as well. Microsoft developed a GPS enabled navigation headset with an immersive navigation system that is intended to feel like "painting a picture of the world through sound" and let you hear your surroundings as a "3D soundscape." The headset provides directions and lives transport information (Wainwright, 2014; Peeples, 2018; Jukna, 2017). New York's Department of Transportation, with the collaboration of a company, has tested a navigation technology called tactile maps (diagrams with three-dimensional features and braille text), which incorporates information from several senses. The technology also tried in Denmark and Sweden before. The maps show how many lanes the person must cross and the

direction of traffic. Moustakas et al. (2007) have developed a new system that converts video into virtual, touchable maps for the blind. The three-dimensional maps use force fields to represent walls and roads so the visually impaired can better understand the layout of buildings and cities. Table 1 describes some of the existing practices that allow free and safe movement for the blind and people

with visual impairments within the city by classifying them as active and passive systems. In this paper, the word “passive” is used as terminology to emphasize architectural design considerations while the word “active” is used for auxiliary elements that complement architectural considerations (e.g., electronic applications, mechanical applications, and others).

Table 1: Aids and smart technologies available for the blind

Name	Passive	Active	Explanation
The long cane	✓		In order to detect obstacles for determining the safe walking routes.
A guide dog	✓		Guide dogs are trained to lead their owner around obstacles. They help to choose the safest routes and indicate learned landmarks on a route.
	✓		Blister paving It is used on pedestrian crossings. It is a warning for someone with a visual impairment that there is a road crossing
	✓		Offset blister paving It is used at train, tram and tube platforms. It is a warning for the edge of the platform
	✓		Corduroy tactile paving It is a warning for the presence of specific hazards like steps, level crossings or the approach to on-street light rapid transit platforms
Tactile paving	✓		Lozenge tactile It is a warning surface on the street that they are approaching the edge of an on-street light rapid transit platform.
	✓		Cycleway tactile paving It is used in conjunction with a segregated shared cycle track/footway. The purpose of the surface is to advise people the correct side to enter
	✓		Guidance tactile It is used to guide people along a route. It can also be used to guide people around obstacles like street furniture in a pedestrianized area
Tactile maps	✓		Tactile maps are 3D maps using map data from OpenStreetMap
Tactile traffic maps		✓	Tactile traffic maps (diagrams with three-dimensional features and braille text). Each map uses 3-D shapes and bright, high-contrast colors to depict the intersection from one of the eight possible perspectives of someone about to cross it
Using beacons		✓	Using beacons which provide audio instructions via a smartphone application
Navigation headsets		✓	GPS enabled navigation headset with an immersive navigation system which lets the user hear the surroundings as a “3D soundscape”

3. Accessibility requirements for disabled persons in urban environments

Planning principles for barrier-free environments are described in a manual by United Nations Department of Economic and Social Affairs, Division for Social Policy and Development, considering the obstructions in the street including street furniture, traffic and direction signs, street plans, bollards, plants/trees, shop awnings, and advertising signs, etc. in the path of disabled travel especially for the blinds. Obstructions should be placed outside the path of travel wherever possible. Obstructions in the pathway should be easy to detect, and if possible, should be placed along one continuous line. Protruding elements should be avoided. The minimum width of a clear, unobstructed path should be 0.90 m. In Table 2, design considerations for the obstacles in the streets are shown.

4. Accessible cities

Accessible cities are the cities that allow disabled citizens and visitors to enjoy travel in cities equally and freely like everyone else. Accessibility has a universal interest during the last few years, and

cities have begun to develop an inclusive sensibility (Pérez-delHoyo et al., 2016). When analyzing the accessibility level of cities, there are several indicators. For example, the European Commission has been launching “The European Award for Accessible Cities” since May 2010. The award is given to the city having improved accessibility in fundamental aspects of city life like the built environment and public spaces, transportation and related infrastructure, information, and communication, including Information and communication technologies (ICT), public facilities and services, the potential for continuous improvements in accessibility in a sustainable way. The city will be able to act as a role model and encourage the adoption of best practices in all other European cities. European access city award winners according to the years are 2020, Warsaw, Poland; 2019, Breda, The Netherlands; 2018, Lyon, France; 2017, Chester, United Kingdom; 2016, Milan, Italy; 2015, Borås, Sweden; 2014, Gothenburg, Sweden; 2013, Berlin, Germany; 2012, Salzburg, Austria; 2011, Ávila, Spain.

Accessibility is very important for the sustainable development of cities. In the same way accessibility of historical towns is very important as well. United Nations Convention on the Rights of Persons with

Disabilities gave foundations that are active in human rights and disability opportunities to use their expertise in the emerging field of disability. The European Foundation Centre (EFC) led those

foundations, and they created the European Consortium of Foundations on Human Rights and Disability.

Table 2: Passive design considerations for the obstacles in the streets (UN-DESA, 2003)

Obstructions on the pathway surface	
<p>A straight shape is rising from the pathway surface.</p> <p>Fixed poles should have contrasting durable color marking strips of at least 0.30 m in length, placed with the centerline at a height between 1.40 m and 1.60 m, to warn pedestrians with limited vision.</p> <p>A raised 0.10 m platform around/under the obstacles.</p> <p>Bicycle stands should also be on a raised platform.</p> <p>Tactile surfaces for a warning on the ground around the obstruction</p>	
Overhanging obstructions	
<p>The signs should be placed in a way relative to the tactile pavement that it will not create an obstacle for the blind Overhanging signs should be mounted at a minimum clear height of 2.00m.</p> <p>The placement of the trees, tactile pavement, and natural guiding lines in relation to the walking route should be done consciously (Havik and Dankers, 2020).</p> <p>Overhanging trees and other vegetation should be pruned to have a minimum clear height of 2.00m.</p> <p>Unnoticeable obstacles lower than 2.00m may project a maximum distance of 0.10m into the pathway. Otherwise, they should be recessed or covered</p>	
Garbage bins	
<p>Garbage bins attached to lampposts should not face the pathway in order to minimize the collisions with pedestrian flow. They should be in contrasting colors so that people with limited vision may easily identify them.</p>	
Spaces below ramps and stairs	
<p>Spaces below ramps and stairs should be blocked out completely by;</p> <ul style="list-style-type: none"> • protective rails • raised curbs <p>They may be noticeable by marking by a tactile surface</p>	
Bollards	
<p>Bollards are used to keep out undesired motor traffic from pedestrian areas. To indicate a non parking area, the bollards should be painted in a contrasting color or colored stripes can be used. The distance between guiding posts should be around 1.20m.</p>	

The League of Historical and Accessible Cities' was launched as a first pilot project in February 2010. The main aim of the project, which is implemented by 11 foundations from 5 different countries (each of them in partnership with the local authorities of the six historical towns) is to improve the accessibility of historical towns and to promote sustainable tourism development and the protection of cultural heritage. Six historical towns included Avila in Spain, Torino, and Lucca in Italy, Mulhouse in France, Viborg in Denmark, Sozopol in Bulgaria.

The project focused on improvements on; the built environment and public spaces, transportation and related infrastructure, information and communication, including information and communication technologies (ICT), public facilities, and services. The main purposes of the project are as follows:

- "To put forward innovative accessibility solutions which allow people with disabilities to fully enjoy cultural and historical heritage.
- To foster tourism and the social development of the city.
- To develop pilot projects that can serve as an inspiration for other foundations, local authorities, and stakeholders.
- To serve as a hub for the exchange of best practices and know-how.
- To lead by example, raise awareness, stimulate ideas, and invite others to act."

Each member city has developed a tourist route, which includes interesting buildings, museums, parks, restaurants, shops, and tourist information centers in the historic city center. As a result, not only will anyone be able to navigate and explore the town landscape independently on these routes, but will also be able to guide and interact with their surroundings by the help of information signs like tactile billboards, sign language guides, and audio guides and other interactive digital tools accessible by everyone. Unfortunately, some cities are not as lucky as the cities mentioned above. One of these cities is Nicosia on Cyprus island.

5. Nicosia walled city in terms of accessibility

Nicosia is located in the middle of the island of Cyprus. Cyprus is a small island which is the third biggest island after Sicily and Sardinia in the Eastern Mediterranean (Fig. 1). Cyprus is a divided island, and it has two parts separated by the buffer zone/green line since 1974. Today, the city of Nicosia, as a divided city, maintains its two-zone character. There is an UN-controlled area in between (Fig. 2). However, it is possible to travel between two sides from three crossing points between the Greek side and the Turkish side. Turkish Cypriot people live in the north, and the Greek Cypriot people live in the south part. The capital city, Nicosia, is the last divided capital city in the world.



Fig. 1: Cyprus map

Nicosia is established in a flat area and carries traces of many civilizations, cultures, and religions in its historical texture. The oldest known name is "Lidra." In Nicosia walled city, there are ruins from the Bronze period and Roman period. The city served as the "capital" for almost all the states that ruled Cyprus since the Byzantine period. In the city, especially the historical structures of the Lusignan Kingdom (192-1489), Venetians (1489-1570), and the Ottoman rule (1571-1878), which lasted 370 years, and the British Colonial rule (1878-1960).

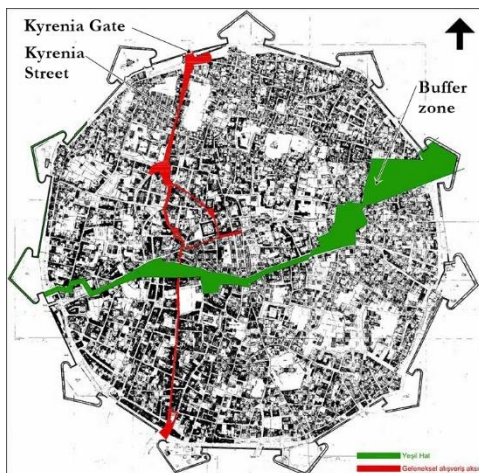


Fig. 2: Nicosia walled city map

Nicosia walled city is like an open-air museum and play an important role in tourism. For this reason, it is an important center visited by tourists as well as local people. Kyrenia Gate provides access to the walled city from the north and is one of the most important entrances of Nicosia.

6. Research methodology

6.1. Study area

The old walled city in Nicosia is one of the prime cultural heritage hotspots in Cyprus. It is surrounded by Venetian walls, and one can observe striking and unique features of Gothic, Ottoman, and British Colonial Period architectural styles. Hence, preservation of the old city with respect to historical and cultural values is of significant importance.

The Nicosia Master Plan team was formed in October 1979 to take on the task of preservation. It

was a joint partnership effort between United Nations Development Plan (UNDP) and the United Nations Centre for Human Settlements (UNCHS/UN-HABITAT). The Nicosia Master Plan has won the [Aga Khan Award \(2005\)](#), with its goal being a better future plan for Nicosia via the development of a physical development strategy. The team was a bicomunal one where Turkish and Greek Cypriots architects and urban planners collaborated together.

The team has studied various aspects of the old walled city, including residential and industrial areas, open spaces, and the roads. Ultimately the project proposal involved plans such as pedestrianized shopping streets and underground car parks. The project has provided a boost in private investment and tourism for the area and attracted new residents, resulting in stronger economic activity. New shops, cultural centers, restaurants, and cafes have become parts of the unique charm of the old city. The pedestrianization gained importance in recent years in the city, and the streets are still developing today.

In this study, some of the streets within the walled city of north Nicosia were examined in terms of accessibility of the blind and visually impaired. The route starts with Kyrenia street, which is a street located on the main shopping axis in the walled city of north Nicosia ([Fig. 3](#)). It is also a starting point for tourists to visit the old city. And Asmaaltı and Arasta Streets are also included in the study area.



Fig. 3: North Nicosia partial map Kyrenia street

6.2. Analysis of the zones in north Nicosia walled city in terms of accessibility of blind and visually impaired

A total of 760 blind people lives in North Cyprus, with an average of 100 in north Nicosia. They have serious problems in getting around individually even in newly renewed areas of the city, including the walled city. In order to reveal these problems, this research was carried out in two zones, as shown in [Fig. 4](#), Zone 1, and Zone 2. In [Fig. 5](#), aerial view of the study area is shown. Zone 1 includes Kyrenia Street starting from Kyrenia Gate, which is one of the entrances to the walled city, and zone 2 includes Asmaaltı Street, Asmaaltı Square, and Arasta Street. The analysis of Zone 1 can be seen in [Table 3](#) and Zone 2 in [Table 4](#). The research is based on the United Nations Department of Economic and Social

Affairs, Division for Social Policy and Development “Design considerations for the obstacles in the streets.”

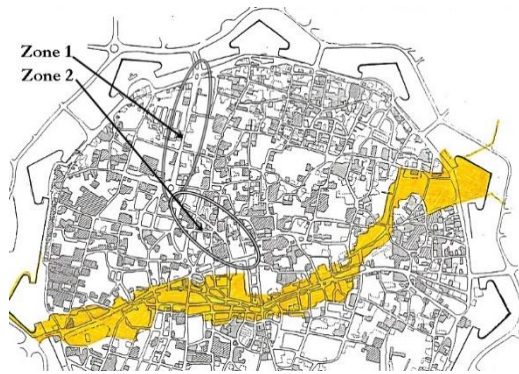


Fig. 4: The zones analyzed based on the accessibility of the blind and visually impaired

Some of the streets in Zone 2 are pedestrianized, starting from 2013. The project first started by traffic arrangements in the area, then in 2017, the pedestrianization works were completed. The project included some of the works like Burying the electricity and telephone lines, installation of new lighting poles, renewal of all water network and drainage lines, installation of electrical hydraulic barriers in order to provide entrance to the pedestrianized area with vehicles at certain hours, arranging the square in front of the Gamblers Inn, parquet floor covering in different sizes and colors including flooring for the access of the blind and visually impaired, placing new trash cans, benches and flower beds on the streets. In Table 4 the analysis of the existing situation in Zone 2 can be seen.

7. Results and discussion

In the process, starting with the Nicosia Master Plan, the change and development efforts regarding the walled city have started to be appreciated even though there are still unsolved problems. Considering that it is the last divided capital city in


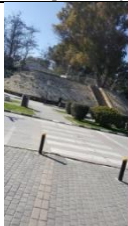




the world, it has become a focus of attention with this feature. As a good development for disabled awareness, UCTCEA “Disabled Standards-The Criteria for the Practice for Cities and Buildings” has been published. Indoor and outdoor accessibility guide based on this standard approved by the Council of Ministers on 29 November 2016. On the other hand, according to the observations made and the results of the interview with the president of the Cyprus Turkish Blind Association, there are serious problems in the city of Nicosia in terms of the ability of people with visual impairments to move independently. According to human rights, everybody should be able to tour the city in the same manner. Considering this situation, necessary precautions should be taken immediately so that the city of Nicosia can become a historical city accessible to everyone.



Fig. 5: Aerial view of Nicosia walled city

As stated in Table 1, Kyrenia Street, which started with the Kyrenia Gate, which is one of the most important entrances in the north direction to the walled city, should be arranged in such a way that visually impaired people can easily get around. At present, it is impossible for a visually impaired person to move individually without help in this street. It is known that attempts have been made to organize this area through a competition organized by the Chamber of Architects.

Table 3: Analysis of Zone 1, Kyrenia street

Obstructions on the pathway surface					
			<p>When entering the street called Girne street through the Kyrenia gate, which is one of the most important entrances of the Walled City, it is seen that no precautions are taken for the comfortable movement of the blind and visually impaired. Blister pavings that are used for pedestrian crossings are not available in pedestrian crossings, although there are ramp arrangements (cells a, b, d). The paths with tactile surfaces that they can follow for the visually impaired are also not available along the street. On the contrary, the pavement surface is not smooth and has features to cause accidents (cell. c). They can be guided only by traditional cues such as a property line (cell e) at a very short part of the route. Obstructions on the pathway surface like street furniture, trees, and other obstacles arising from the surface are placed irregularly (cell f). Overhanging signs are also placed irregularly (cell g). Garbage bins, fixed poles, and bollards also do not meet the standards</p>		
					
(d) Overhanging obstructions	(e)	(f) Garbage bins			



(g)

Spaces below ramps and stairs
Not applicable for Zone 1



(h)

(cells h, i, j). Visually impaired individuals do not seem to be able to travel individually without help, in the region along the Kyrenia street up to the Sarayönü Square in Zone 1.



(i)



(j)

Although the necessary arrangements for the comfortable movement of the visually impaired have been partially made in the Zone 2, when the current situation is examined, it is seen that the blind and visually impaired persons are completely ignored. As can be seen in Table 4, it is observed that the tactile path is blocked and excluded in some parts. The shop owners' anxiety to display their products in front of their shops, the desire of cafes and restaurants to create outdoor seating areas, the improper placement of urban furniture, and the cars parking on the pedestrianized area even on the visually impaired pathway, proved this unawareness. Similar

research on the problems of visually impaired persons in city life which has been carried out in five cities in Turkey indicated that Problems such as insufficiency of disabled roads, blocking of disabled paths in front of restaurants, cafes, and shops, and illegal parking of vehicles on the paths seem to be common problems (Özteke Kozan and Bozgeyikli, 2018). It is important to create "community awareness" in short, as it consists of sensitive individuals who can empathize with the proper use of these areas in the built and designed environment (Uslu and Güneş, 2017).

Table 4: Analysis of Zone 2

Obstructions on the pathway surface



(a)

(b)

(c)



(d)

(e)

(f)



(g)

(h)

(i)



(l)

(m)

As indicated on the map above, starting point for Zone 2 is the entry point from Sarayönü Square to Asmaaltı Street. At this point, guidance path tactile surface can be noticed on the ground (cell a). Until this point there is no aid for the blind and visually impaired persons all along the Kyrenia Street as mentioned before. It is seen that the distance of protruding devices such as air conditioner outside unit, hydraulic barrier or other power boxes are not suitable even if the distance of the guide surface on the ground to the building line is in compliance with the standards (cells b, c, d, k). In addition, the guide road is blocked due to the desire of the shop owners along the path to display their products in front of their shops (cells e, f, n, r, s). In Asmaaltı Square, the street furniture are placed in a way to intersect with the guide path and constitute an obstacle (cells g, p, t, m). The guidance tactile surface in front of the Büyük Han/Great Inn which is one of the most important historical buildings in Nicosia, is not arranged in a way to emphasize its entrance (cell h). Another unacceptable thing is that the car parking on the pedestrianized area, especially on the guidance tactile paths (cells j, k, l, m, o). Blister paving used for pedestrian crossings which is a kind of surface provides a warning to someone with a visual impairment that they are at a road crossing are available on pedestrian crossings in the area. Most of them are properly placed (cells z, a1), but there is one blocked by a hydraulic bollard which will create danger for people (cell a1). Cars that park on roads where blind pedestrians will cross are another problem (cells l, a1).



(n)

(o)

(p)



(r)



(s)



(t)

Overhanging obstructions



(u)



(v)

Garbage bins



(w)



(x)



(y)

Spaces below ramps and stairs

Not applicable for zone 2

Bollards



(z)



(a1)



(a2)

Overhead elements are generally in the form of fabric shades and do not cause problems in terms of height (Cell u, v).

Garbage bins are located inappropriately in terms of both height, distance and location next to the guidance path (cells w, x, y).

Hydraulic bollards are used for controlling the traffic circulation at certain times. Some of them are not properly placed and creates a problem for the blind and visually impaired persons.

Being one of the most important historic cities of the Mediterranean region, the city of Nicosia should be accessible to everyone and especially to the visually impaired people who are the subject of this study. In areas that are currently adapted to the visually impaired usage, precautions, and, if necessary, some sanctions are required to keep these pathways open for use in accordance with the purpose of their construction. This can happen with regular checks rather than leaving this area on its own. Another alternative is to shift the pathway to a suitable place on the pedestrian walkway considering the current situation.

As a cultural heritage, Nicosia walled city is like an open-air museum with very important historical buildings. Kyrenia Gate provides an entry to the walled city from the north, and it is one of the most important gates in Nicosia, as indicated before.

While walking through the Kyrenia Gate, a blue line (Fig. 6) can be seen, which directs the tourists and helps tourists to wander around easily. Tracking this blue line directs and leads you to see the important historical buildings which the tourists must see in the walled city. The conditions on this route should be adapted to the use of visually impaired people.

Telephone applications, which have started to be used in Northern Cyprus, can be improved for blind citizens and tourists. Likewise, audio information systems with applications currently used around the world can be combined with tactile paths to ensure safe movement. The sense of touch is very important for visually impaired people. Tactile maps can be used in certain points of the city with an audio warning or information systems. Three-dimensional mock-ups of these buildings can be provided together with audio information systems in appropriate areas around the very important

historical buildings on the route, and the possibility of perceiving these buildings by touch may arise. In other words, the walled city tourist route should be arranged in such a way that the visually impaired people can tour in the city and get information without any help, in a comfortable and safe way, and to enjoy as much as other people.



Fig. 6: Blue line as a guide for tourists

Another important issue is education. By providing training within the association of the visually impaired, citizens are informed about new technologies and possibilities for comfortable circulation, communication, and access to information. In order to avoid the problems seen in Table 2, the society should be educated about the access of the visually impaired and awareness should be raised. In order for the Nicosia walled city as a cultural heritage, which is the pearl of the Mediterranean, to be a city that can be accessed by everyone, every level of the society should develop awareness on this issue.

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

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