



## Article

# Cairenes' Storytelling: Pedestrian Scenarios as a Normative Factor When Enforcing Street Changes in Residential Areas

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**Abstract:** Pedestrian scenarios refer to all types of transit, including unidirectional, bidirectional, and crossing actions. This study argues that pedestrian scenarios are critical normative factors that must be considered when implementing street changes in existent residential areas. It focuses on pedestrian safety and reliable access. Making improvements to urban streets without adhering to the assessment criteria for street design results in the presence of more cars on the road, which makes crossing streets unsafe. The aim here is to provide assessment criteria for street development projects. This study used three qualitative methods, starting with a scoping review to define the urban street improvement assessment criteria. A spatial analysis was conducted using geographical maps and site visits to determine how specific residential areas have changed. Then, a storytelling analysis method, based on episodic narrative interviews with an anonymous sample of 21 residents, workers, and visitors, was imposed. The results yielded pedestrians' stories about how street improvements affected pedestrian scenarios on two streets in the Ard el Golf residential area in Cairo, Egypt. The results showed that unplanned changes in urban streets' socio-spatial configurations affected residents' preferences for pedestrian safety and their reliable access to services on either side of the street. Our results reveal that practitioners can develop these assessment criteria for pedestrian preferences through storytelling techniques. The concluding remarks outline a set of criteria for assessing improvement projects of urban streets. The added value here is that practitioners can learn from users' storytelling, and thus avoid street risks when undertaking improvement projects on other urban streets and cities.

**Keywords:** everyday life; Egypt; episodic narrative interviews; pedestrian safety; street design



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## 1. Introduction

The concept of pedestrian scenarios links together community activities to meet people's daily requirements (Abusaada and Elshater 2021; Mohanty and Chani 2022). There are various types of transit situations in pedestrian scenarios, including unidirectional, bidirectional, and crossing actions. In urban streets, stairwells, and bottlenecks in pedestrian facilities (such as transportation terminals and retail centers), unidirectional and bidirectional flow conditions are typical (Vanumu et al. 2017). In each scenario, the region's residents, workers, and visitors undertake walkable trips (Murakami et al. 2021; Villani and Talamini 2021). Changes in the walking scenario are often due to two types of emergency circumstances. The first are emergency changes in a specific area due to the halting of vehicle movement (Özdemir and Selçuk 2017). These changes include widening roads or adding new activities and events. The second are those in which people want to alter their trip to alleviate boredom or to experience movement that brings them joy (Wael et al. 2022).

Egypt's decision-makers have begun attempts to improve traffic movements in some residential areas of Cairo, Egypt, focusing on the urban street network. The Greater Cairo Region's Ard el Golf district, an extension of Heliopolis (administered by Nasr City), has been undergoing improvement since 2012 (Elshater et al. 2022b). In 2019, the improvement

process culminated with the extension of the subway system. This expansion also affected the local street network and saw the construction of flyovers to facilitate automated traffic flow (Eldaidamony et al. 2019). Nevertheless, some residents, visitors, and workers suffered as a result of pedestrian crossings, which became unsafe, and service accessibility became difficult (Abusaada and Elshater 2021). This study assesses pedestrian safety and reliable access in Ard el Golf, and the findings should be considered by decision-makers and practitioners when improving streets in existent residential areas.

The problems discussed in the literature arise when decision-makers attempt to improve the urban street network without involving pedestrians (Moura et al. 2017), or considering public participation (Smith 2023), pedestrian behaviors (Avineri et al. 2012), and pedestrians' preferences in their everyday lives (D'Acci 2019). In this vein, two challenges regarding pedestrian safety and reliable access in residential areas arise. The first is the dominance of traffic arrangements that favor the flow and speed of traffic, and hinder pedestrian crossing (von Schönfeld and Bertolini 2017; Anapali et al. 2021). The second is the challenge of meeting daily needs and ensuring satisfaction in general pedestrian safety through transit facilities (Anciaes and Jones 2018; Elshater et al. 2022a; Villani and Talamini 2021), mobility justice, and conviviality (Bertolini 2020; Prytherch 2021).

After improving urban streets by widening them to smooth traffic flow, decision-makers need to pay more attention to the hierarchy of urban streets (Levinson and Zhu 2012). This hierarchy has to facilitate pedestrian crossing and accessibility to services on either side of the road (Ahmed et al. 2021). In favoring vehicle movement in these improvement projects, the problem becomes the removal of pedestrian sidewalks and central islands, and facilities for crossing streets within a walkable distance (Gerike et al. 2021). Street network development projects also include removing slow lanes for transportation, and building flyovers, footbridges, and underpasses to facilitate vehicle movement (Anciaes and Jones 2018; Hamman 2015; Hickman and Sallo 2022). These changes have led to the dominance of automated traffic, affecting daily pedestrian experiences in moving between services and recreational activities (Erturan and Spek 2022). Decision-makers should consider the design aspects of pedestrian movement on sidewalks and crossing when taking action to widen streets and improve traffic flow.

In many cases, ancient cities have sought to improve their facilities for vehicle movement for functional (Bertolini 2020; Erturan and Spek 2022; Montella et al. 2022) and technical reasons (Bertolini 2020; Hamman 2015; Monazzam et al. 2016). This improvement aims to enable fast traffic flow and reduce traffic congestion and journey times (D'Acci 2019; El-Kadi 2013; Rychlewski 2016). In addition, other studies have indicated that this improvement often leads to changes in pedestrian scenarios for residents, workers, and visitors, related to their daily activities (Erturan and Spek 2022). According to Shafik et al. (2021), and Moosa (2022), among the most important of these changes that have been seen in Heliopolis are: (1) the conserving of heritage tramways; (2) the building of a city subway; (3) the construction of bridges and the removal of highway tunnels; and (4) non-compliance with the standard specifications pertaining to the hierarchy of urban streets, in terms of (a) the hierarchy related to street width, the number of lanes, central islands, sidewalks, pedestrian traffic paths, and parking lots, and (b) pedestrians' movements through crossing points, traffic lights, and parking lots, and their relationship to points of movement.

Numerous studies have discussed the effects of improving urban streets in ancient cities, focusing on walkability (Brookfield 2017; Erturan and Spek 2022; Moura et al. 2017) and pedestrian crossing facilities (Anciaes and Jones 2018). Other studies have considered how to encourage long-term changes in cities (Rychlewski 2016) and how people think about beauty (aesthetical cognitive perceptions) (D'Acci 2019). Another discussed pedestrians' behaviors and fears of crossing city streets because of the width of streets and concerns over fast traffic (Avineri et al. 2012). Additionally, many studies have discussed the relationship between pedestrian safety and reliable access in old residential areas. These studies focus on pedestrian preferences for safe and pleasant scenarios (Brookfield 2017). However, these horizons must be broadened in order to resolve the lack of studies

discussing the relationship between pedestrian safety and reliable access, particularly as regards urban street improvements in old residential areas.

Urban planners and designers are increasingly considering pedestrian safety to be a vital issue. Urban planning practices that ensure the sustainable development of the built environment focus on several paradigms of urbanism, such as new urbanism (Filmanowicz 2008), post-urbanism for pedestrian safety (National Institute for Transportation and Communities (NITC) (2019); WHO (World Health Organization) (2013); Zegeer et al. 2006), and transit-oriented development (Thomas and Bertolini 2022). In providing services and facilitating recreational activities, these paradigms respond to the demands of daily life. Moreover, they may provide paths that accommodate mechanical movement of all forms, along with walking, cycling, and public transportation. Residents' dominant environmental preferences are also considered. These preferences relate to local amenities as one of the main positive attributes experienced while walking, along with social interaction, noise, green space, and density (Brookfield 2017). Urban street design also must consider the use of various crossing facilities, in light of accessibility, convenience, safety, security, and crossing time (Anciaes and Jones 2018).

In meeting this study's aims, it would be valuable to know pedestrians' preferences. One possible solution would be to examine their narratives in terms of storytelling (Hulst 2012). As part of our efforts to illuminate this uncharted area, we have examined the narratives that residents and visitors give in relation to their daily lives. We have also prepared four maps of pedestrian scenarios that illustrate movements during shopping, hiking, leisure, and work.

The functional dimension of urban street improvements projects in old residential areas changes how cities work, and this needs further investigation. The following two questions indicate the use of Cairenes' stories to develop ideas that site planners and designers can build on to improve urban streets.

1. What are the most important technical and functional parts of street design that will guide this change?
2. Do pedestrians change the scenarios of their daily movement between activities when the street layouts change, and if so, why does this change occur?

This study aims to use participants' stories to identify technical scenarios and functional behaviors from the pedestrians' perspective that can be used as a guide for historical road improvements. This study also aims to present ideas derived from Cairenes' stories to handle the relationship between pedestrian scenarios and the risks of street crossing, focusing on pedestrian safety while accessing services on the opposite side of an urban street.

This study has utilized three qualitative research methods, and is based on a case study in the Ard el Golf district in Cairo, Egypt. The first and second methods involve a scoping review and spatial analysis applied to the selected case study, respectively. The third method adapts a storytelling technique to shed light on pedestrians' perspectives about the development projects enacted in the case study.

The novelty of this research is related to using storytelling to consider the changes in pedestrians' daily experiences of movement between activities in order to examine pedestrian safety and access reliability. A significant advantage here is that this approach offers an opportunity to study and improve ideas for development projects to be undertaken in urban street networks based on users' stories. The results will assist in determining pedestrians' daily movement scenarios in old residential areas as part of the functional dimension of the urban street improvement project. This research also represents a contribution to site planning and design, which will make pedestrians safer and improve accessibility in their daily lives.

## 2. Materials and Methods

### 2.1. Case Study

Situated in northeast Cairo, Egypt, Ard el Golf is a residential area of the suburb of Heliopolis. Because it is close to Heliopolis's business and commercial hub, the district



is a popular place to live. Figure 1 shows the geographical location of the selected study area relative to Cairo. It also shows the study area's boundaries, which combine parts of El-Sayed El-Merghany Street and Ahmed Tayseer Street in Ard el Golf. Ard el Golf also features several schools, hospitals, and green spaces, making it an attractive option for many families. Since 1947, improvement processes have transformed Ard el Golf from a golf course into a residential area.



Figure 1. Geographical location and boundaries of the study area.

In 1999, Ard el Golf became an administrative part of the West Nasr City district ([Elshater et al. 2022b](#); [Shafik et al. 2021](#)). It is still a residential area, similar to Heliopolis in terms of its urban character. We collected data from El-Sayed El-Merghany Street and



Ahmed Tayseer Street. El-Sayed El-Merghany Street defines the northern boundary and connects it with the Heliopolis district.

Three reasons prompted the researchers to choose this area to study:

1. This study area includes two well-known streets among Cairo residents: El-Sayed El-Merghany Street and Ahmed Tayseer Street. Both streets show how the city has changed in terms of its urban form and layout. They also reflect the constant changes in daily pedestrian movement scenarios;
2. The researchers have frequently visited this site for over twenty-five years, and have lived there for more than fifteen years;
3. Since the 1970s, the site has undergone several functional changes.

Ard el Golf is bordered to the south by Al-Nasr Road (the Autostrada), to the east by El-Nuzha Street and Al Thawra Street, and to the west by El-Tayaran Street and Salah Salem Street. Figure 2 shows the transformation that has taken place as a result of improvement projects undertaken on street networks.



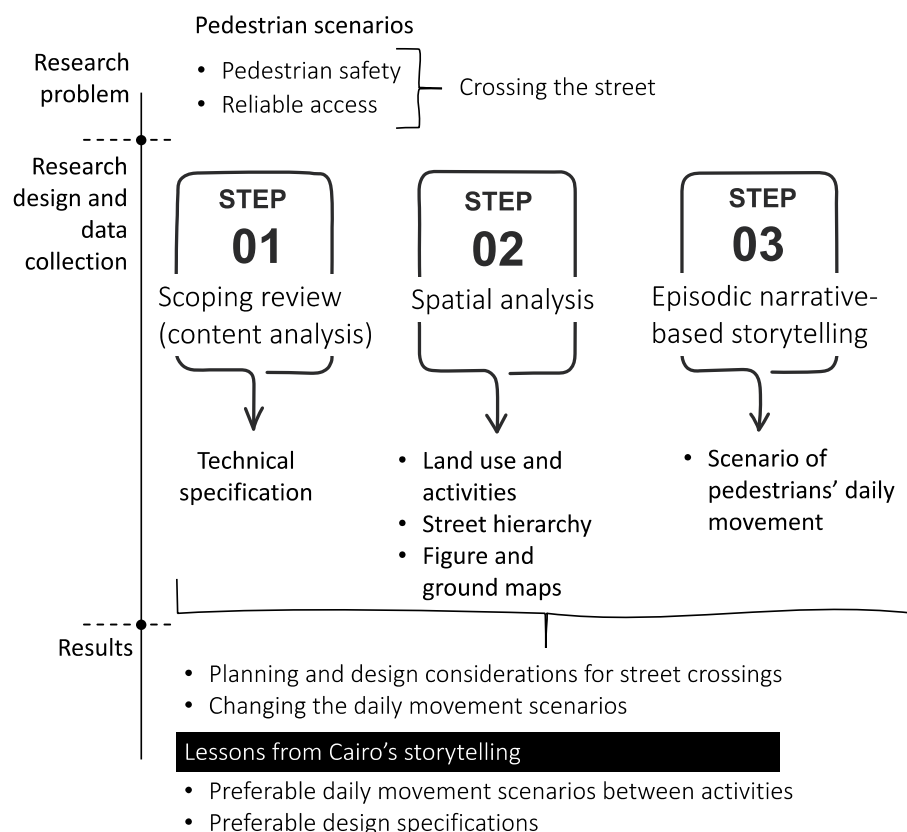
**Figure 2.** The transformation of the site.

## 2.2. Research Design and Data Collection

We have assumed that addressing pedestrian safety and reliable access during daily movements between residential activities represents one of the most important ways to improve urban streets in old residential areas. This study analyzed pedestrians' preferences in relation to two streets in Cairo, Egypt, regarding mainly residents, workers, and visitors. The findings of this study can help professionals to achieve greater pedestrian safety and more reliable access by understanding people's perspectives on how urban street improvements impact pedestrian scenarios.

Descriptively and narratively, we collected the relevant data using three qualitative approaches. Using a scoping review (Ye et al. 2022), spatial analysis (Elshater et al. 2022b), and episodic narrative-based storytelling (Ettinger et al. 2021) to collect data, we were able to achieve a more objective understanding of the urban street improvements that have been undertaken in old residential areas. By understanding people's stories, city planners can create better urban street designs that support pedestrians. The data were split into three sets:

1. A theoretical set of assessment criteria for the improvements of old city streets, focusing on pedestrian safety and reliable access. This set considers pedestrians' preferences in real-life situations when moving from one activity to another;
2. The visualized changes made to urban streets, using internet-based aerial maps (hierarchy, number of lanes, sidewalks, parking lots, and pedestrian crossing areas), which information was verified through frequent field visits;
3. Cairenes' stories of daily scenarios of movement between activities before and after the changes made to the urban streets of Ard el Golf in Heliopolis (Figure 3).



**Figure 3.** The research design and data collection.

This study investigates the idea that “daily pedestrian movement between activities” should be a crucial part of projects seeking to improve city streets. We focused on how pedestrians can avoid the dangers of crossing streets in residential areas, where cars are the most common mode of transportation. By focusing on two points, pedestrian safety and reliable access, this study analyzed stories told by Cairenes regarding the changes seen following projects to improve two streets in Ard el Golf, Cairo, Egypt. The data processing approach comprised three phases that enabled us to learn lessons from these stories.

The study began by setting out the assessment criteria for urban street improvement in old cities. We used a scoping review to identify the references relevant to the theoretical data collected ([Abusaada and Elshater 2022](#); [Elshater and Abusaada 2022](#)). The research question was: how does the literature contribute an understanding of the technical and functional aspects of street design that might help to guide this change? The SCImago Journal & Country Rank and Scopus were used in identifying journals and manuscripts related to this topic. The data mining approach relied on a random selection of articles. This review utilized relevant keywords from the titles, abstracts, keywords sections, and entire texts. These keywords were preferences, pedestrians' preferences, pedestrian crossings, pedestrian safety, pathways, tramways, traffic, streets, street design, walkability, accessibility, mobility, and storytelling. The data mining was conducted from 2012 to 2023.

Inclusion was limited to journals and articles. Architectural, social, and urban studies were also included. Books, book sessions, and conference proceedings were excluded from the data analysis.

The second phase involved exploring the chronology of spatial changes that occurred at the urban street level. This phase enabled us to clarify the status quo in 2022, including land uses, street hierarchy, figure and ground maps, and activities. The spatial analysis was based on internet-based aerial maps and frequent field visits. Aerial maps from Google Earth also helped us to investigate the history of the site.

In the third phase, data were collected regarding the changes in pedestrian scenarios using storytelling techniques. [Lewis and Hildebrandt \(2019\)](#) and [Sandercock \(2003\)](#) consider storytelling to be an aspect of qualitative research during planning practice. This study sought out respondents' stories regarding changes in their movement network and related activities. In this phase, we used the ethnographic research method, carried out through episodic narrative interviews invoking storytelling from permanent residents, visitors, and workers regarding the various challenges they encounter, focusing on their preferences for pedestrian safety and reliable access at the level of the urban street. The participants' stories helped us to explain exactly what is going on. Interviews enabled researchers to find out what people believe, and to see things from their point of view. They can also help people become more familiar, and thus feel more comfortable in sharing their stories and experiences.

### 2.3. Participants

We developed our knowledge of pedestrians' preferences via three stages. We then conducted interviews on both streets at different times to solicit informal discussions that yielded narratives on street improvements. The interviews were conducted in English.

In the first stage, contextual information was used to find out the person's gender, age, level of education, where they lived (permanent residents, non-permanent residents, visitors, or someone else), where they worked, and how much they knew about the area's history. A random group of 36 people—20 men and 16 women—was chosen for these interviews. The interviews took place on weekends between November and December 2022; each lasted between 15 and 30 min. In the preliminary interviews, fifteen of the thirty-six participants fell in the younger age range of 18–35 years, followed by eight in the 35–45 age group and six in the 50–60 age group. Finally, the over-65 age group was the least represented, with five participants. These numbers have no connection with the demographics of Ard el Golf or the Heliopolis residential area. In total, 20 participants had a university education, and 10 had a primary education. We excluded the remaining six from the rest of the investigation because they had no level of education; as our questions were asked in English, this group was unable to interpret the questions and express their stories similarly to other participants. These were typically native Arabic speakers.

In the second stage, we focused only on those with a reasonable degree of education, usually at the university level. In terms of origin, twenty participants had been residents of Ard el Golf for more than 30 years, and the remaining sixteen were from other areas—half from Cairo and the other half from other cities outside Cairo. We excluded per capita income as a measure for classifying the participants. Of the 21 participants (10 males and 11 females), 9 were permanent residents, 5 were non-permanent residents who worked in commercial and recreational sectors, and 4 were visitors from outside the Ard el Golf District, including 3 female students at the Girls' College. The participants' ages ranged from 18 to 70. Participant samples were enclosed if they met the following criteria:

- More than ten years spent living in Ard el Golf;
- Represented a variety of races, classes, and beliefs;
- Showed intellectual and psychological differences to the point of dissonance and divergence;
- Showed excellent leadership, control, initiative, and decision-making skills;
- Took chances to undergo a few different trips.

In Ard el Golf, the stories that were given showed how things such as pedestrian crossings, the planning and design of urban streets, and design specifications affect how people move from one activity to another. As previously stated, we only used the stories of those who had long-term experiences with the place, and knew it well. The collected spatial data focused on the street level. The episodic narrative review, based on storytelling, focused on pedestrians' preferences regarding safety and reliable access in relation to the improvement of urban streets. The participants responded to two questions. The first was: how do sudden and unexpected changes in the characteristics of urban streets affect a person's perception of safety and security when crossing these streets? Secondly, have these changes affected the daily commute scenario on the one hand, and the enjoyment of reliable access on the other? We used three indicators to determine how changes at the street level affect pedestrians' stories: avoidance of crossing the street to avoid accidents, the lack of reliable access to everyday activities (facilities and services), and the need to change plans because of changes in movement possibilities.

In the third stage, we asked the participants to speak freely about their experiences on El-Sayed El-Merghany Street and Ahmed Tayseer Street. In this context, the question was: "Do these difficulties cause people to change their daily movement scenarios between activities?" The focus was on how changes in space and quality affected the safety of pedestrians, and how easy it was to move between activities. We asked the participants to imagine themselves undergoing a typical day's activities. Then, they refined their feedback with consideration of their knowledge after giving additional comments. We then asked three permanent residents with extended knowledge of the area, including one of the female students residing at the Girls' College dorms, to draw maps of the routines they follow daily.

### 3. Results

This section discusses the results in relation to pedestrian safety and reliable access in three different stages: the assessment criteria of urban street improvements related to the pedestrian scenario, using a scoping review; the chronology of the changes, using spatial analyses; ideas derived from storytelling, using episodic narrative interview-based techniques.

#### 3.1. Results of Scoping Review: Urban Street Improvement

In the scoping study, we mined the data for technical specifications and the scenarios of movement between daily activities, focusing on crossing the street. Relevant professionals can also use the criteria we have established here when assessing urban streets, as they help to identify risk areas and develop ways to reduce those risks.

##### 3.1.1. Street Design and Technical Specifications

Seven assessment criteria related to street network development projects undertaken in old cities, while protecting pedestrians from the dangers of crossing the streets, have been laid out with their relevant technical specifications and objects:

1. Improve the city's internal street network to meet the requirements of the hierarchy, and ensure safe and active traffic, without modifying the specifications of specific roads to make them into arterial roads or collection routes, and without sacrificing their pedestrian-friendliness (Levinson and Zhu 2012);
2. Promote safe and appropriate speeds for pedestrians with horizontal traffic calming, speed bumps, or cushions (Macdonald et al. 2018);
3. The addressing of safety issues affecting pedestrians, cars, and trams by slowing down cars and giving pedestrians the right of way (Rychlewski 2016);
4. Designing paths that are more "walkable" as regards distance, time, and effort, and crossings that are safer for pedestrians who must follow divergent routes and cross streets to reach their destination (D'Acci 2019; Rychlewski 2016). Pedestrian crossings with traffic lights should be no more than 20 min apart (Anciaes and Jones 2018);



5. The viewing distances of drivers and pedestrians should be extended ([Montella et al. 2022](#); [Rychlewski 2016](#)), and the placement of street furniture, benches, planters, and trees should be improved ([Macdonald et al. 2018](#)), to provide safer pedestrian crossings;
6. The ease of walking (walkability) and accessibility to amenities should be taken as primary principles ([Frank et al. 2019](#));
7. Sidewalks are essential for pedestrians, and other uses (e.g., car parks or additional spaces for shops) should be restricted on sidewalks, in favor of restaurants and street vendors. Fixed and movable barriers help in keeping sidewalks open for pedestrians, and ensure streets are safe and accessible ([Frank et al. 2019](#)).

### 3.1.2. Site Planning for Daily Scenarios between Activities

The eight criteria that we use for assessing urban streets illustrate how these streets work, and how people go about their activities on them. The consideration of these criteria is essential to ensuring safety in crossing the street. Professionals can consider pedestrians' preferences in order to create more vibrant streets that meet the needs of each area:

1. The transformation of the urban street network, the urbanization of land, and preferences for use, focusing on the role of sociability and its effects on daily rhythms, are essential components that must be examined, along with the rapid and unpredictable changes accompanying them ([Brookfield 2017](#));
2. The different scenarios of daily movement undertaken by residents and visitors should be mapped to show how these daily scenarios change with successive urban street improvement projects ([Erturan and Spek 2022](#));
3. Considerations of typology, accessibility, and functionality should contribute to the development of the urban form (and the hierarchical ordering of activities should always be refined in relation to activities preferred in different seasons) ([Xia et al. 2022](#));
4. Adding new opportunities for activity, improving the quality of services, and increasing opportunities to experience the pleasant, peaceful, quiet, historical, socially connected, and memorable aspects of a place help create vibrant urban streets ([Moura et al. 2017](#));
5. Spaces should be designed to facilitate playful experiences that allow pedestrian participation and avoid the development of an impersonal, stressful, and frustrating environment ([Smith 2023](#));
6. The best way for people to have different social experiences is to gradually transition spaces from public to private ([Thwaites et al. 2020](#));
7. Mixes of personal and commercial users, such as street vendors, should be organized along the street to meet the needs of all groups. This arrangement will make pedestrians feel safer and more comfortable ([Thomas and Bertolini 2022](#));
8. Long-term plans for projects that will improve urban streets must consider and adhere to the arrangement of activities on urban streets ([Bertolini 2020](#)).

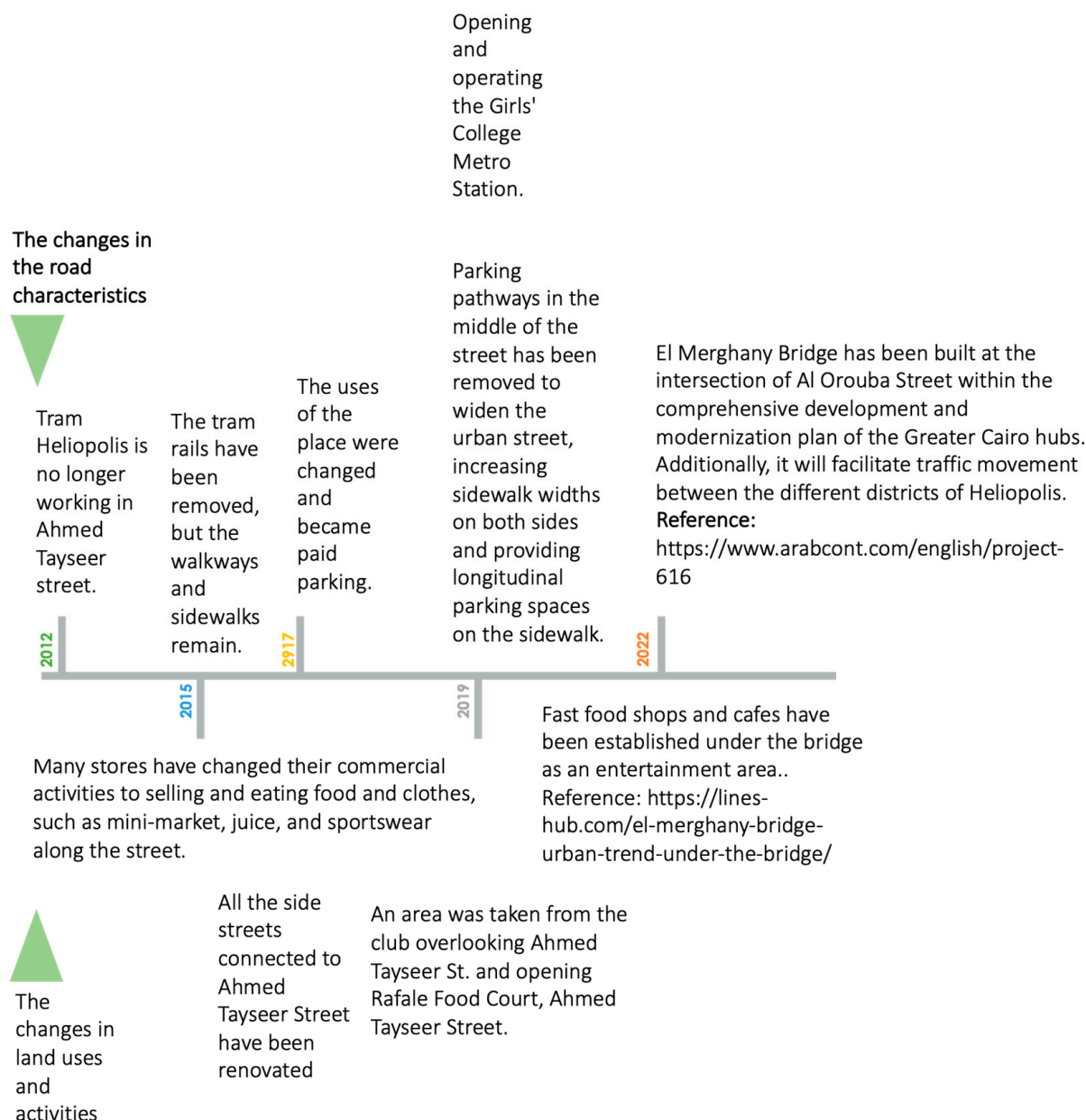
### 3.2. Results from the Spatial Analysis: Urban Streets with the Chronology of the Changes

The results of the spatial analysis show the changes related to street network development in the Ard el Golf area. The following description refers to two aspects of these changes in urban streets. The first is the study area's spatial changes between 2012 and 2022, including the change in road characteristics and the change in land uses and activities. The second is the status quo of activities in 2022.

#### 3.2.1. A Timeline of the Study Area's Spatial Changes between 2012 and 2022

According to accurate maps and the researchers' own memories, many changes took place between 2012 and 2022, in two key areas. The first was the removal of the Egyptian tramway system and the establishment of a subway. Meanwhile, the most significant change in land use and related activities was the addition of recreational, commercial, and

service facilities. This included the widening of urban streets, with the addition of car parking facilities and the construction of overhead bridges, in order to facilitate automated traffic flow. Figure 4 illustrates the spatial changes that took place in the two study streets in 2022.



**Figure 4.** A timeline of the study area's spatial changes between 2012 and 2022.

### 3.2.2. An Illustration of the Status Quo in 2022

The spatial analysis of urban streets in our case study reveals two aspects of the existing situation. First, there is a change in road characteristics based on (a) land use, (b) street hierarchy (widths, specifications, and parking availability), and (c) the figure and ground map. The second is the shift in activity transition scenarios (Figure 5).

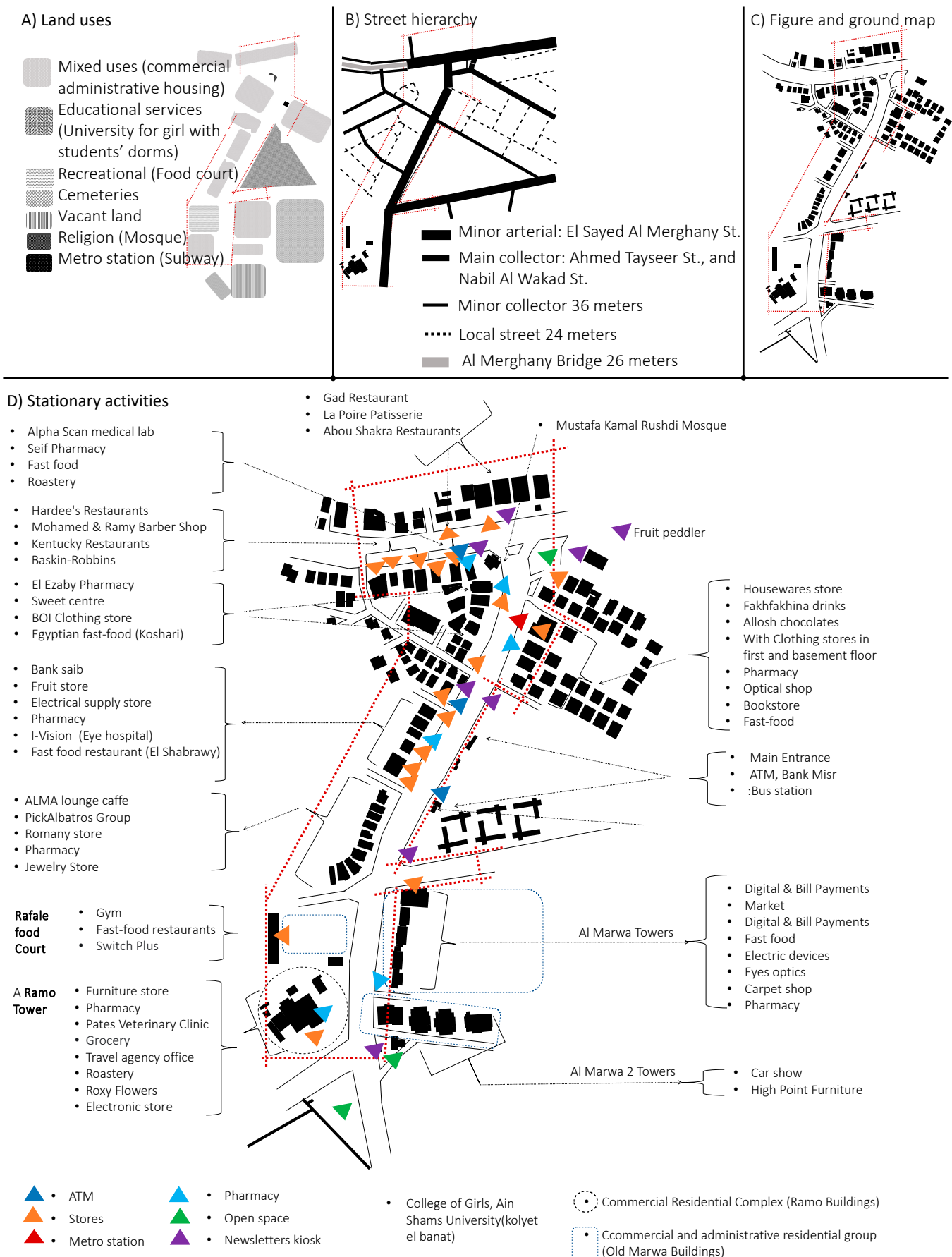


Figure 5. The status quo of activities in 2022.



The study area is a residential neighborhood with apartment complexes, restaurants, small businesses, a university for girls, and recreational centers. People living in these districts engage in numerous activities, such as attending events, walking around the neighborhoods, and shopping at local stores. In addition, recreational community centers offer facilities such as swimming pools, sports courts, playgrounds that families can enjoy, fast food restaurants, and food courts. The area includes three types of buildings, which are multi-story residential, with middle floors for administrative offices, doctors' clinics, lawyers' and engineers' offices, and medical analysis laboratories; fast food restaurants, pharmacies, stores that sell electronics, juice shops, cafes, small restaurants, grocery stores, car showrooms, and furniture stores are on the ground floor. The last building type on the site includes the university for girls and the buildings used for medical purposes. The spatial analysis revealed the presence of kiosks selling newspapers, ice cream, soft drinks, and chocolate, as well as ATMs in several locations.

The hierarchical structure of these urban streets originates in the secondary arterial roads, such as El-Sayyid El-Merghany Street, which has a width of 72 m, five lanes, and a sidewalk that is six meters wide on each side, including facilities for parking perpendicular to the sidewalk. It is followed by Ahmed Tayseer Street, with a width of 45 m and four lanes on each side. The road and sidewalk on each side are five meters wide, and parking lots are set out perpendicular to the sidewalk. Primary and secondary collector streets follow next, with widths of 30 m and facilities for parking parallel to the curb on both sides. Next are local streets with a width of 16 m, two lanes, and facilities for parking parallel to the sidewalk. Examples of changes applied to these road characteristics include the removal of the Heliopolis metro, the expansion of traffic streets, and the construction of overhead bridges.

A spatial analysis of the figure-ground diagram that shows El-Sayyed El-Merghany Street and Ahmed Tayseer Street shows that four- to twelve-story apartment buildings constitute the majority in this area. Information on this variety of building has no type, group of activities, or typological context. The analyses of land use and types of activities show that many commercial and recreational activities are carried out on the lower floors. For example, pharmacies, fast food restaurants, and clothing stores open onto the streets, and seem to emerge without warning or a clear plan.

### 3.3. *Storytelling Ideas: Episodic Narrative Interviews*

Street improvement projects should result in fewer accidents, better access to public transportation, greater walkability, better traffic flow, improved accessibility, and a greater mix of uses. In investigating these changes, the main focus was on pedestrians' ability to access places on either sides of the street, and their safety while crossing the street. Exploiting the storytelling technique has enabled us to explore the impacts of improvement projects on pedestrian safety and the reliability of access in the study area.

#### 3.3.1. *Street Design and Technical Considerations for Street Crossings*

Pedestrians might face difficulties in going about their activities due to the need for more places to cross and more light signals. The following results mirror those from previous studies by [Anciaes and Jones \(2018\)](#), in which most people who took part said that pedestrian crossings had changed in the last ten years.

An owner of a retail store in his 60s said, "In the past, we had the metro, but the street was narrow and easy to cross. Today, older people tend to prefer to cross the street alone."

A worker in another store, who was in his 50s, said, "Since the street widened, I struggled to cross the street and had problems with drivers and verbal conversations because the cars were speeding and did not stop [...] I was always paying attention while crossing the street. However, one month ago, a motorcycle came from the other side and hit me across the street [...] From this day on, I cross the street only when necessary. There should be more pedestrian crossings and traffic lights on this street."

Many other participants have voiced similar concerns. A 19-year-old student of rural origin who lived at the College of Girls, Ain Shams University, said, “Because this is my first year living away from my hometown in Upper Egypt, I must buy the basics from the shops on the streets. I am terrified whenever I cross the street to save time [...] Do you believe me when I say there are no crosswalks, traffic lights, or signposts? Every day I imagine myself dying on the streets.”

Another student of the same age and at the same university said, “I love to eat Egyptian Koshari in Cairo, so I leave the residence half an hour before lunch to cross the streets, always avoiding pedestrian bridges and underpasses [...] designers should use different ways to cross streets to protect pedestrians from the risk of injury.”

A third university student in Cairo smiled while stating, “When I cross the street, I do not wait for cars to slow down before moving forward. Suppose the driver sees how brave and determined you are to cross. In that case, he will slow down [...] if you ask about my preferences. We need shorter, safer pedestrian crossings to improve viewing distances for drivers and pedestrians.”

The stories of students from outside Cairo differ from those voiced by Cairenes. People from outside Cairo were much less accustomed to crossing busy roads. In contrast, residents of Cairo were able to deal more effectively with the lack of traffic lights or pedestrian crossing areas. Moreover, people perceive these issues differently depending on their age, education, and sociocultural background. This difference shows how familiarity with a location’s sociocultural aspects affects attitudes, which is consistent with findings from previous studies, such as those by [Avineri et al. \(2012\)](#), [El-Kadi \(2013\)](#), and [Smith \(2023\)](#).

A young man working in a fast food restaurant said, in a sarcastic tone, “There are no designated places for pedestrians to cross, and there is no single traffic light or signs to cross the streets along the street.” An architect in his 60s who worked for a private architecture firm said,

“In the past, crossing the street from anywhere was familiar, but a fast car struck me while I was crossing. To cross the street now, I must walk to the end of the street. [...] You can find islands that make it easier to get across. They must slow down whenever a driver sees someone crossing at these points.” His wife, a woman in her 40s working as an architect at the same firm, said, “In fact, developers strive to provide pedestrian safety and comfort.”

The last two comments are consistent with the findings of [Frank et al. \(2019\)](#), according to which wide sidewalks enhanced walkability at different times. A 60-year-old male psychiatrist and his wife, a homemaker of the same age, told of their experiences with the sidewalks before and after the improvement projects. The psychiatrist said,

“Before street improvement, the sidewalks were narrow; moving on foot was impossible [...] now, walking on the sidewalk is still challenging because some visitors believe these sidewalks are natural extensions of car parks.”

Another lady commented in astonishment that

“[...] some car owners park on the sidewalk designated for pedestrians in two rows, so the place has become crowded with car organizers charging money on top of the sidewalk.”

On the other hand, a pharmacist owner in his 30s said,

“Anyone who wants to walk on the street must have a guide, or they may run into the cement flower boxes in front of the shops or avoid the merchandise lined up outside the shops [...] keep an eye out for a news kiosk or cigarette stand occupying the sidewalk. This chaos forces anyone to leave the wide sidewalk and walk in the middle of the street among speeding cars; also, some shop owners leave their wares on the sidewalk.”

In line with [Macdonald et al. \(2018\)](#), our study shows that one of the benefits of incorporating innovative street design in improvement projects relates to the relationship

between pedestrians and moving traffic, as access to activities can be made more reliable and efficient. This was the opinion of a group of young people of both sexes, who gather in their cars near a fast food restaurant.

A twenty-year-old student at the University of Architectural Design (male) said, "The improvement project made it easier to park near catering restaurants while we were sitting in the car. But, as you can see, the car situation doesn't consider how people walking and people who work in restaurants might get in each other's way. Most of the time, I find the worker at the juice shop almost hitting a pedestrian on the sidewalk."

A young employee of a fast food restaurant stated that,

"Because of this improvement project, Ahmed Tayseer Street is now a well-known spot for Cairo residents [...] the improvement project helped create a pedestrian-friendly environment by widening sidewalks, adding benches, and planting trees. This allowed people to walk around more comfortably and safely, making the area a more attractive destination for people to visit. The only remaining issue was the conflict between pedestrian movement and car parking."

### 3.3.2. Changing Daily Pedestrian Movement Scenarios

Our results in this area align with those of [Smith \(2023\)](#), [Erturan and Spek \(2022\)](#), and [Xia et al. \(2022\)](#), who showed that city street improvement projects significantly affect how people get from one place to another. In the long term, these changes can improve the quality of life of city dwellers. On the other hand, some improvements may limit accessibility because they increase street traffic. We conducted our first interviews at Rafale Food Court, where young university students gather with others of both sexes.

A female student in her 20s at the Faculty of Tourism and Hotels stated,

"Rafale Food Court offers a variety of activities that people of all ages can enjoy, such as restaurants, cafes, and recreational facilities [...] the surrounding residential buildings and recreational facilities provide a particular scenario for those interested in entertainment."

Another female student in her 20s at the same faculty added,

"I am a resident of the area. Urban street improvement projects led to new activities in Ahmed Tayseer Street, such as a roaster, a pet home, dry cleaners, hairdressers for women, and international brand ready-to-wear shops."

Most participants gave voice to similar stories about the shops under El Merghany Bridge, situated on the other side of the street. They also agreed that fast food restaurants and cafes represent another means of use of the residential area.

An accountant at an investment company in his 30s commented, "Establishing restaurants under flyovers, after developing a network of traffic, is a smart decision [...] These activities changed daily pedestrian movement scenarios."

A female dentist in her 30s said that "these activities have lost much of their urban identity, for which they were famous." Furthermore, a male student at the Faculty of Fine Arts and Architecture aged 24 said,

"The problem is that the new building should have considered the history and grandeur of Merghany Street [...] because of the similarities in the bridges and under the bridges, it is impossible to distinguish the areas on the street."

A woman who specialized in architecture and urbanism said,

"People who make decisions should talk to development experts about the place's identity and character. This consultation will help ensure that the needs and points of view of the local community are considered when making decisions [...] it ensures that improvement projects work according to the area's specific needs and align with local culture."



To expand this, we also investigated whether the improvement projects affected people's movements in their daily lives, and if so, why and in what way. People reported being committed to specific routines in their daily lives. The chronological and spatial analyses of these changes reveal no common scenarios. The stories told here indicate that the urban street improvement projects affected the participants' daily lives, and may have hindered their ability to cross the street safely.

A medical laboratory worker in his 40s stated, "There are no specific places where one starts or ends a journey, but the circumstances determine the scenario. Similarly, a woman in her 30s—a pediatrician in a private hospital—added that "after the road-width changes, pedestrians' ability to cross the street becomes limited [...] I believe these matters affect many people's daily lives and scenarios."

### 3.3.3. Four Different Everyday Scenarios

By analyzing how people move through the streets, and forming visualizations of their daily movement between activities, it is possible to select proper and more reliable assessment criteria for urban street improvement projects, with a focus on pedestrian safety and reliable access. Concerns may be raised about the deductive argument presented by this investigation, which can be addressed in the future via interviews with experts in this field. Because of this potential limitation, we consider these results and discussions as limited to their immediate context, and thus as requiring additional research in the future.

Four participants drew their daily routes on different pieces of paper (Figure 6). These drawings show changes in each routine caused by several factors, such as a lack of pedestrian crossings, the presence of traffic lights making crossing the street at specific places too hard, the closing of some shops and the opening of others aimed at different economic and social levels, and the desire to travel by foot without a car.

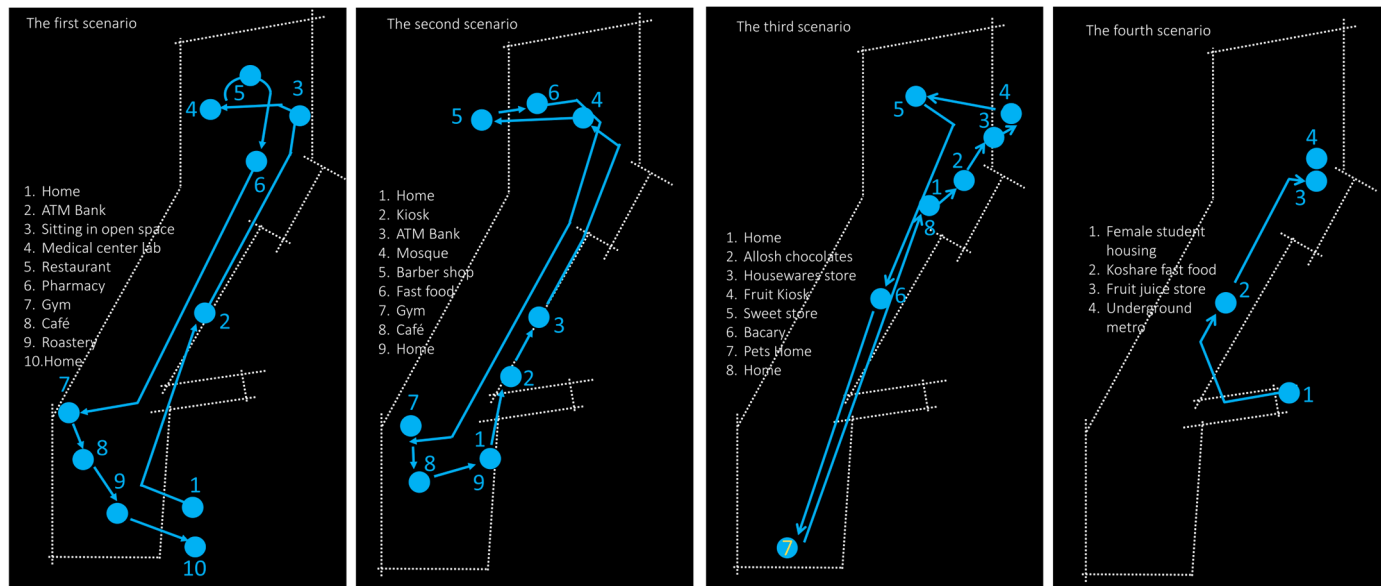


Figure 6. Four scenarios of daily pedestrian movement between activities.

## 4. Discussion

This study has set out criteria for assessing street network development projects via a scoping review. This scoping review has provided seven street design and technical specifications, and eight site planning and design criteria. These 15 criteria were developed by comparing the results of theoretical analyses with the results of a spatial study and the stories told by participants. We included spatial analyses and storytelling approaches to illustrate the importance of considering the changes felt in daily life when making any

change to street network patterns. Thus, this constitutes the additional, 16th criterion that should be considered when assessing street development projects.

Evidence shows that pedestrian safety and reliability of access are essential in many old residential areas, wherein people live and work, or are visitors. According to this study, improvements to street design should consider changes to how people move between their daily activities. By listening to the stories of residents, workers, and visitors in one of the residential areas in the Ard el Golf district of Cairo, we have gained a better understanding of how the city's streets work, which will guide subsequent improvement projects on the urban streets.

First, even though Ard el Golf is an extension of Heliopolis's old district, the design of urban streets in this residential area is different. There are effective urban streets in Ard el Golf, but the safety of pedestrians and reliability of access here necessitate paying more attention to technical specifications and functional considerations. Thus, the presence of permanent, non-permanent, and visiting residents must be reflected in the discourse around site planning and design paradigms, which it is not. This study shows that current projects aimed at improving urban streets should more closely consider pedestrians' preferences regarding safety (crossing the street) and reliable access (how people get from one place to another in their daily lives).

Second, the views of pedestrian reflect one of two contrasting states: welcome or displeasure. Traffic flow was considered smooth, and people liked the low level of congestion caused by the limited street network before improvement. On the other hand, after the improvement processes, some people were unhappy with the reduction in pedestrian safety and reliable access. Moreover, some residents had to change their daily movements, but most visitors and workers were unaffected. When improving urban streets, it is necessary to understand the specific everyday context within an urban setting both before and after the improvement.

Third, in light of the first two points, this study suggests that improvement plans for urban streets in old residential areas should take into account pedestrians' stories, in relation to the assessment criteria of pedestrians' scenarios and spatial analyses. When improving cities, it is imperative to ensure that the daily needs of all permanent and temporary residents and visitors are met. Site planners must consider how cars and people move when they attempt to change a city street. This way of thinking will ensure that pedestrians are safe and can reach their destinations quickly. Access should also be provided to commercial and recreational activities, and street designers also have to closely assess which pedestrian crossings and traffic signals will be controlled by pedestrian lights.

Fourth, improvements to urban streets in old residential areas can improve everyday life. The results of effective spatial planning and episodic narrative interviews provide evidence for this. Furthermore, by changing the locations of facilities and incorporating pedestrian experiences in movement, a more stimulating and pleasant environment can be created that also allows for efficient pedestrian movement. More studies should be performed in various parts of cities with diverse spatial structures so as to highlight pedestrians' experiences with urban street improvements, as most Cairo residents preferred these changes.

These four findings are consistent with prior studies that show the effects of street design on pedestrian safety (Anciaes and Jones 2018; Avineri et al. 2012; Dada et al. 2019). They indicate suggestions for policy-makers that would improve urban street and freeway crossing safety (Dada et al. 2019; Mohanty and Chani 2022). Our set of criteria for assessing urban street improvement projects based on a scoping literature review will help to ensure pedestrian safety while crossing urban streets (Levinson and Zhu 2012; Macdonald et al. 2018; Rychlewski 2016; Anciaes and Jones 2018). Based on previous studies, improvements should take into account street network hierarchy and slowing vehicle speeds (Levinson and Zhu 2012; Rychlewski 2016). The criteria that we have developed confirm the results regarding our case study. This indicates the importance of facilitating pedestrian movement

along walkable pathways, and the provision of amenities (Elshater 2016, 2020; Abusaada and Elshater 2020).

Furthermore, our results indicate that maintaining sidewalk width to ensure its suitability for walking is crucial (Abusaada and Elshater 2021; Frank et al. 2019; Brookfield 2017; Hickman and Sallo 2022). In light of this, more resources must be allocated to meet safety standards (Erturan and Spek 2022). This will help to protect pedestrians and drivers alike, and ultimately, save lives.

#### 4.1. An Action Plan for Urban Streets Improvement in Old-Built Environments

Urban planners and designers can develop ideas to improve urban streets by examining people's stories regarding the relationship between pedestrian scenarios, and crossing risks on the street, focusing on pedestrian safety and access (reliable and desirable). Urban designers and policymakers should follow six pieces of an action plan when improving old-built environments (Abusaada and Elshater 2018). This action plan allows people to cross urban streets and reliably access daily activities safely.

1. Identify the exact site of the improvement project.
2. Develop urban street design standards and classifications (functions, hierarchy, widths, number of lanes, speed, and walkways).
3. Propose varieties and multiple activities and reorder and organize them according to expected movement scenarios (activity relationships, diversity, and business/leisure trips).
4. Determine safe pedestrian crossing points by reviewing the technical specifications for the urban street network.
5. Redetermine pedestrian crossing locations based on technical specifications.
6. Provide suggestions for improving pedestrian crossings based on daily scenarios between activities.

#### 4.2. Guideline-Based Assessment Principles and Criteria

Building developments and existing built environments should prioritize pedestrian safety and reliable access to activities alongside urban streets. Developing spatial analysis and 12 guideline-based assessment principles is part of this priority. These guidelines focus on street design (based on technical specifications) and site planning (based on daily scenarios between activities).

Group one: Technical specifications for pedestrians crossing streets safely

Policymakers commit to pedestrian safety by using technical specifications when designing streets. These guidelines include principles and criteria to reduce accident risk when crossing urban streets. They include urban streets' hierarchy, parking space availability, pedestrian right-of-way equality, pedestrian-friendly infrastructure, visibility of pedestrian crossings, traffic-calming measures, and traffic light and pedestrian signals. Technical specifications help practitioners identify gaps in street design and develop strategies to bridge them. Policymakers and practitioners can also use the specifications to measure and monitor their progress over time.

1. Understanding and memorizing urban street hierarchy: In the old district, the encounter between collector and local streets remains unchanged. This concern is because collector streets provide the main access points for people living in the city. In contrast, the local streets are used to access individual buildings directly. This hierarchy of streets remains the same, even in older districts, as it provides the most efficient way to navigate the city.
2. Parking space availability should be designed for collector streets and local urban streets. The relationship between them should allow easy access and safe and effective movement, ensure traffic flows evenly, and prevent congestion. This interconnected relationship reduces on-street parking, allowing more space for pedestrians and cyclists.



It also should efficiently serve buildings, residential, commercial, and recreational activities, and pedestrian crossing points.

3. Giving pedestrians the right of way: Encouraging drivers to yield to pedestrians to prevent accidents, making walking a more attractive option to reduce congestion on the roads, and creating a sense of community and connection between pedestrians and drivers, which can lead to a safer and more enjoyable experience for everyone.
4. Prioritizing pedestrian-friendly infrastructure: Sidewalks are essential for pedestrians and should prevent non-pedestrians from using sidewalks as car parks or additional spaces for shops, restaurants, and street vendors. Fixed and moving barriers help keep sidewalks open for pedestrians and ensure streets are safe and accessible. Improved street lighting increases visibility to reduce accidents.
5. Creating increased visibility of pedestrian crossings: Slowing pedestrian speeds and making them more appropriate through viewing distances for drivers and pedestrians and a better design of available spaces for street furniture, benches, planters, and street trees should be used to provide safer pedestrian crossings.
6. Traffic-calming measures reduce traffic speed and motor-vehicle collisions, making roads more inviting for pedestrians and cyclists. The measures include horizontal and vertical speed bumps, chicanes, roundabouts, cushions, and speed tables. It also includes traffic circles, raised and textured crosswalks, illuminated signs, and other visual cues to remind drivers to slow down. They also provide physical barriers such as bollards that separate pedestrians and cyclists from traffic.
7. Traffic lights and pedestrian signals: Traffic lights and pedestrian signals inform pedestrians when to cross a road. Most pedestrian signals are designed to ensure orderly traffic flow, allow pedestrians or vehicles to pass through an intersection, and reduce accident risk. Moreover, they reduce the waiting time at an intersection for cars and pedestrians. It should take at least 21 min between pedestrian crossings and traffic lights. This situation ensures that pedestrians have enough time to cross the road safely before the traffic lights turn green and to prevent delays in traffic flow.

#### Group two: Site planning for daily scenarios between activities

Professionals can use pedestrians' preferences to develop vibrant scenarios that suit each street. These guidelines include principles and criteria for catering to pedestrian preferences, including diverse activities, rearranging activities, multiple daily movement scenarios, enhancing pedestrian engagement, and balancing the needs of all groups with long-term plans.

1. Diversity of activities: This measure measures people's ability to fulfill all their daily needs from one side of urban streets by repeating similar activities. For instance, cities with dense street networks often have grocery stores, restaurants, and other services within walking distance.
2. Activities are rearranged according to their functions and use in separate urban streets. They should also be compatible with each other and other activities in public spaces, such as fixed kiosks selling snacks and street vendors.
3. Create multiple scenarios for daily movement between activities with an updated arrangement of compatible activities. These scenarios consider people's preferences and adapt to crossing urban streets, traffic-calming, traffic lights, and pedestrian signals.
4. Enhancing pedestrian engagement: By understanding and analyzing people's accounts of movement scenarios according to spatial and temporal contexts, as well as different cultures, lifestyles, conditions, and economic capabilities.
5. Balancing all groups' needs with long-term plans: This measure requires careful and strategic planning to ensure continuous and balanced consequences of urban street improvements for all stakeholders over time. It considers the needs of pedestrians, cyclists, drivers, public transportation users, and other groups in the community. Creating an action plan that meets all stakeholders' needs is the goal of each improvement project.

#### 4.3. Research Limitations

The main limitation is here that our suggested assessment criteria still need to be improved in order to cover older and more newly established cities. Urban residential areas exhibit different levels and types of land use, and these different scenarios determine how urban streets should be improved. According to the stories told by a random sample of Ard el Golf residents, visitors, and workers, a significant limitation of the study is that it only addresses an area within one district of the city. Expanding the sample size and including more people would make the study's results more reliable and significant. Another limitation is that our study area was within an old city, which faces challenges related to infrastructure compared to newly established cities. This study also overlooks the experiences of vulnerable groups, such as older people, children, disabled individuals, and ethnic minorities, who are particularly susceptible to safety concerns. Providing photos of the site and the interview would have provided better context images. However, the process of collecting photos from the site when conducting our study presents challenges. These include the cost of renting aerial equipment, safety concerns, and the time it takes to capture images.

#### 5. Conclusions

This study argues that how people move between their daily activities, and how safe and easy it is for them to do so, should be considered one of the most critical factors when improving streets in old residential areas. Doing so would allow professionals working on urban street improvement projects in residential areas to succeed, and increase the safety of citizens. Such improvements should thus create environments that encourage and protect the everyday movements of people, such as safe and reliable walking places. This study undertook ethnographic fieldwork, using stories about how people walk around to help plan better city streets. It explored how stories can help us to understand and enhance the urban experiences of Cairo's pedestrians.

The most significant challenges facing future researchers include improving planning and design specifications, developing systems of automated traffic flow that keep pedestrians safe, improving reliable access, and reflecting real-world scenarios. Our results suggest that more research that explores topics related to memory and lived experiences is needed. Site planners and designers who want to improve the streets in old residential areas must improve their knowledge on how residents, workers, and visitors navigate the streets daily. They can use the experiences recounted by diverse groups of residents to compare different possible ways of improving city streets. This method comprehensively considers constants, variables, strengths, and weaknesses. As part of this method, a set of criteria for assessing the spatial planning and design of urban streets, and which can reflect pedestrians' preferences based on land use and activities in each specific residential area, is set out. Future research may also consider performing a comparative study to validate the assessment criteria in various cities, and developing our assessment criteria for application to different case studies in old and newly established cities.

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