An Evaluative Study to Determine the Extent of Shat Al-Arab Corniche Design Conformity with Active Urban Design Principles

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Abstract

The trend of active urban design appeared in the year 2005, and as a result of the increasing factors encouraging inactivity and lack of physical activity, cities began to move towards active urban design to make physical activity part of daily practices in the urban environment, which supports the health of its residents. The research dealt with the concept of active urban design, its principles, and the most important influences on human behaviour that encourage active practice in the urban environment. Then the history of physical activity in the city of Basra and inherited popular sports was reviewed, then the extent to which the urban development processes that took place in Corniche Shatt Al-Arab Street and the surrounding area were achieved was measured. Due to its historical, social and economic importance and the conclusions that accompanied the measurement process related to the most important obstacles facing the city in its path towards a sustainable urban design that preserves the health of its residents.

Keywords: Active urban design, Active city, physical activity, physical health, sustainable trends, Principles.

1. Introduction

Urban design has taken new directions within sustainability concept, one of them is active urban design which promote physical activity in daily life practices. And this study will focus on riverbank as an essential urban resource for activating physical movement by taking advantage of the natural landscape, Water element in general contributes to the urban ambience. The influential elements in revitalizing the urban space interact with natural, built, and social context. Iraq has unique water resource that spread across most of its cities, which has recently witnessed development operations in its riparian areas. This study will examine these development measures by evaluate Shatt al-Arab Corniche developing project to be aware of implementing active urban design principles. Research problem: Testing the compatibility of the most

important vital areas in Basra city with active urban design principles. Research hypothesis: The possibility of identifying appropriate interventions apply active urban design principles in Basra future development processes. Research goal: Directing sustainable urban development in Basra to keep up with modern trends, especially active urban design trend that focuses on enhancing physical activity, in urban development processes.

2. Methodology

The deductive approach was used to study the concept of active urban design and its principles and find these principles variables to test them in the selected area study by analysing (descriptive analysis) Basra Corniche development project.

2.1 Active urban design

Emmanuel S.; and Moushumi C. [11] define active design as a practice that encourages physical activity by creating built and spatial conditions that support staying healthy for a longer period of time, and supports the principles of sustainability and inclusive design in addition to economic flexibility. While Philip C.; and others [18] define active urban design as integrating the design of buildings and city landscapes with physical activity through a set of principles and guidelines for planning and construction to make sport a part of the daily routine. However the most important reason for the emergence of this trend is the low level of physical activity in contemporary societies. Therefore, active design can be defined as the practice that prepares various environments surrounding the population to contain physical activities with the aim of urging them to practice the minimum amount of physical activity necessary to maintain health through an active, healthy and effective daily routine.

2.2 Identify active urban design levels

Spatial conditions play an important role in promoting human physical activity in cites, and these levels are divided into three levels as follows:

City level: providing opportunities to participate in physical activities which achieved by integrating physical activity into everyday life, such as playing and walking in parks for recreational purposes, and active transport, meaning that all forms of mobility rely primarily on physical exertion away from motor vehicles, such as walking, hiking and Cycling. Attention must be paid to influence residents' physical activity factors when structure is viewed as a network of small spaces spatially related to social characteristics with health potential and City challenge is to create physical spaces where physical activity becomes a continuous and important part of everyday life. Neighbourhood level: neighbourhoods play an important role in activating city role as it is effectively the place which determine the lifestyle of its inhabitants. Building Levels: Encouraging physical activity throughout building design, ramps and stairs, as well as visual communication between floors and visibility of the main entrance by Rana M.M.; and Kameelah A. [19]. And in this research city level will be concerned, and we will gradually present this aspect by defining the urban city and then water areas that stimulate physical activity.

2.3 Active Urban Design Principles

Some studies have examined some of the characteristics that must be provided in the urban environment to promote physical activity, including what was provided in the design of Le Corbusier's Radiant City [16], which had separating pedestrian traffic from car traffic, emptying the ground floor, leaving wide green spaces, in addition to transparency. In the other hand the book of "The Death and Life of Great American Cities" by Jane J. [14] discussed activating mixed use of land, increase walkability and the principle of safety and social communication. David P. J.; and Amy S.H. [13] refer to providing outdoor and indoor play areas and increasing opportunities of participating in activities, Sara W.; and others[20] discussed paying attention to details such as the presence of sidewalks, street lighting, accessibility and the availability of enjoyable scenes, there is also providing active transportation systems, and site design by Christine M.H.; and others[8].The characteristics of the road, represented by quality, safety, comfort, and enjoyment, in addition to the surrounding area, represented by the use of the land, the activities that occur there, their density, the population density, the area of commercial buildings, the size of the streets, and the number of their intersections, besides providing infrastructure to serve active activities by Chanam Lee; and Anne V.M.[7].

The concept of active design crystallized in England, and the focus was on three basic principles (improving accessibility, enhancing amenities, and increasing awareness) according to Sport England [22], then principles expanded into ten secondary from the basic principles: (1. Enabling and encouraging activities in neighbourhoods, 2. Walkable communities by activating active transportation between all locations, 3. Connected, safe and integrated paths for walking and cycling, 4. Co-location of community facilities , 5. A network of multi-functional open spaces, 6. High-quality streets and spaces that sustain a variety of users and community activities, 7. Adequate infrastructure that provides and facilitates access to facilities , 8. Active buildings providing opportunities for activity in and around them, 9. Managing, maintaining, monitoring and evaluating the long-term functionality of all spaces, 10. Promoting activity and local champions according to Philip C.; and other [15].

2.4 Active city definition

Active city is a city that motivates all society groups due to their abilities to practice physical activity on a daily basis, by providing appropriate spaces with equipped with various facilities and tools to attract all these groups and riparian areas in cities can be physically activated by adding Walking and cycling paths along the path of rivers and streams to encourage walking or bicycles in leisure time for entertainment and improving physical health. Also water gives opportunities to practice sports and games with physical activity, such as rowing, swimming or fishing. Both according to the depth and area of the water, some of which are practiced in rivers, and others in streams and lakes by Ad de Bont; and others[1], It can also defined as a continually works city to create and improve opportunities in the built and social environments and expand community resources to engage all citizens in practice physical activity in daily life, which encourages physical activities, active living and exercise by integrating them with community activities by Peggy E.; and Agis D.T. [17].

2.5 Active human behavior

The role of social aspect in designing active urban environment by adapting the individual's behaviour in surrounding environment to be transformed from inactivity state to activity, which helps understand the most important determinants of built environment affects. Behaviour is defined as a set of motor responses issued by the body's muscles to carry out many daily activities in accordance with life's requirements. It is either innate or acquired as a result of contact with the surrounding environment.

Alan W. [3] classified human behaviour into three categories: The First is Individual behaviour: These are the actions and behaviours that express the individual's personality, knowledge, values, culture, and acquired experiences.

The Second is Collective behaviour: It is a general trend in expression and participation, Opinion and ideas, known as the public opinion of a group linked ethically, ideologically, or spatially, and the power of influencing behaviour stems from the culture of society, which in turn leads to a kind of homogeneity and a sense of belonging. The third is Social behaviour: These are the activities practiced by individuals and groups in the surrounding environment, and therefore it is a mutual relationship between the environment and humans. The human relationship with the surrounding environment has a significant impact on the efficiency of space's performance of its economic, social, environmental and cultural functions. This, in turn, directly affects the functionality and aesthetics of the built environment. This part deals with the analysis of the mutual influence between the built environment and active human behaviour in urban space by Azmi Z.Z. [6].

The positivity of adapting active human behaviour in the surrounding environment in proportion to its components and characteristics is determined through analysis of the process of correspondence between behaviour and environment, which is explained by the psychological processes that the individual goes through while in a particular situation. Most traditional models and theories of human behaviour have focused on the characteristics of individual and social behaviour. The overlapping development of individual behavioural factors and various variables at the group level confirms that maintaining a certain level of physical activity among individuals requires a set of abilities, skills, knowledge, motivation, and readiness. This model was developed in which organizational competencies were built on three areas: motor efficiency, control efficiency, and self-organization efficiency. The integration of the work of the sub-efficiencies depends on a set of elements that transform the efficiency into behaviour and increases complexity in understanding human physical activity behaviour due to its relationship to some personal factors according to Simon B.; and others [21]. On the other hand Daniel S. [9] models of environmental behaviour emerged that took into account broader influences by including features of the physical environment to understand "people's interactions with their physical, social, and cultural surroundings". And when talking about active behaviour Alfonso mentioned in her hierarchy of human needs to make urban space walkable five basic needs Khairi A.; and Mohamed G.A.; and Gehan S. [15].

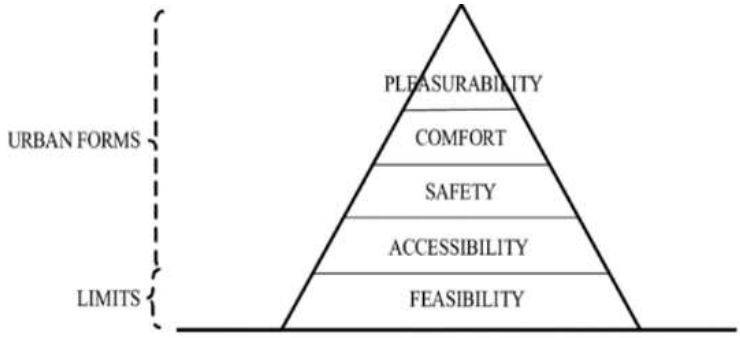

Fig.1: Alfonso hierarchy of walkable urban space human needs.

As a conclusion of previous studies the principles and tools used in designing active cities differ in an interactive way with the characteristics and fabric of the city and in proportion to the social and cultural environment of its inhabitants, but the most important principles that all cities share are the three basic ones, which include improving accessibility, Promoting comfort, increasing awareness with some of secondary principles and variables as clarified in table1.

Table1. Active urban design principles

Basic principles	Secondary principles	Variables
Improving Accessibility	neighbourhoods Supports participation in active practices	Reduce traffic
	Create conditions for active transport	Designing connected walking and cycling paths integrated with public transport network.
	Insure safety and connectivity	-Designing shared streets with clarifying boundaries
	Shared community escort	-Mix use
	Open spaces and streets with multiple functions and uses	-Remove public spaces unnecessary boundaries
Promoting the amenities	Infrastructure supports physical activity	- Adequate lighting -Seating
	Management, maintenance, monitoring and evaluation	-Shaded areas -Trash cans -Public facilities -Adding sports equipment in open spaces
Increasing community awareness	Promoting activity and local sports champions.	-Raising awareness of the use of soft policy by adopting a vision for the city that supports physical activity -Encourages the revival of traditional folk sports

3. Basra city

Basra is one of the three largest cities of Iraq, Sited on Shatt al-Arab waterway, in close proximity to the Persian Gulf, at a distance of 55 kilometres (34 miles) from the Gulf and 545 kilometres (339 miles) from Baghdad, which is Iraq's largest city and capital, its population about

2,908,491 in 2018. It is the country's main port. It was founded as a military encampment and played an important role in early Islamic history.

3.1 Urban fabric

The development of the urban fabric in the modern city of Basra was represented by several stages, the most prominent of which is the stage of the two cores (Old Basra and Al-Ashar), represented by the central focus, which is Old Basra and its suburbs. Then the centre moved to Al-Ashar, which helped to strengthen this suburb and its development, so it emerged as a competitor to the old centre, which is characterized by narrow alleys and organic planning. This extended The period (1868 AD - 1916 AD), followed by the stage of the three nuclei, which began with the emergence of a new nucleus in the Maqal as a result of the construction of the port, which contributed significantly to the expansion of the urban area. In this stage, straight streets and grid planning appeared in the Maqal area in the 1930s. This period extended (1917 AD - 1951 AD) Armin S.M.[4] , but in the fifties of the last century, fragmentation appeared in its urban structure as a result of the establishment of new residential areas on the outskirts in areas of a desert nature devoid of orchards. This stage was called the fragmentation stage and extended for the period (1952 AD - 1968 AD), and then in the period that followed the year (1968 AD), the urban fabric began to be characterized by what distinguishes it from previous stages. The scattered parts of the city seemed to be cohesive Hamed, T.H. [13], after that, Basra suffered from deliberate neglect of infrastructure services, as salt water in the city was not treated before pumping for the people, and sewage was released into the internal Ashar River, which dried up and became a stream of stagnant water. The road network was not developed, and many buildings that were part of the Ottoman and British urban heritage were burned and destroyed during the Iran-Iraq war in the year (1989 AD) In addition to the migration of a large group of the city’s population, city’s situation continued to deteriorate during the American occupation in (2003 AD), many houses, governmental and archaeological buildings, and infrastructure were destroyed. Represented by roads and factories, some of which were destroyed by weapons and explosives from the occupation forces and some terrorist groups, and others as a result of acts of theft and looting. In an attempt to repair what was destroyed in previous periods, a proposed plan was designed for the urban development of the city in (2010 AD), and work on it is supposed to be completed in (2035 AD) and is shown in the fig.2 According to UN Habitat [24].

Fig.2. The proposed foundation plan for the city of Basra 2035 AD / UN-Habitat, 2020 AD.

3.2 Social and cultural environment

The social characteristics of Basra are diverse and varied, with a pluralistic society coexisting, including Arabs, Kurds, Turkmens, as well as religious minorities such as Christians and Yazidis. The region where Basra is located has been famous for its commercial function since ancient times, and due to this function, it has been inhabited over the years by people of different languages, skin colours, characters, religions, professions and customs. This feature also allowed its inhabitants to travel between different countries and come into contact with different cultures. Therefore, the society of Basra before and after Islam has a great complexity and diversity, becoming a meeting point of multiple tendencies and different cultures. However, as is the case in other parts of Iraq, Basra is generally dominated by Arab-Islamic majority and tribes. These are mainly social and cultural influences, maintaining traditional lifestyles, behaviours, customs and habits According to UN Habitat [24].

Basra boasts a rich cultural legacy, much like other cities in Iraq. It encompasses not just the splendid edifices but also the sizable crowds that gather at the shrines and places of worship. This tradition dates back to pre-historical times and is evident in the archaeological remains. While some of this heritage has been unearthed, most of it remains buried and undiscovered. The central Basra Qadima, with its intricate network of canals, walkways, and Shanasheel buildings, is another remarkable facet of Basra's cultural heritage due to Firas A.Q.; and Bozhan H.; and Anna S. [12] . However, due to the pressures of contemporary development and financial constraints, most of Old Basra has been severely damaged. By emulating the principles that made Basra the "Venice of the East" and integrating the undiscovered archaeological sites into the urban landscape, the city can regain its former glory and status as a leading city in the region According to UN Habitat [24].

3.3 physical activities

In the past city's residents were practicing physical activities as a part of their daily life, and the most common activities were horse riding, which was also used in former transport vehicles, and the use of canoes, or what is known locally as minnows, for transportation and fishing, in addition to fencing, later as city urban design changed especially in the era of the Ottoman Empire and the beginning of the British occupation. Collective sports activities began to take their role in the city like Basketball which entered Basra in 1912 AD through the American school known as the High Hope School, which contained an area for practicing basketball, as it is the popular American game. As for football, it is noteworthy that it became widespread in the city as a result of the British Army practicing this sport in front of the city's residents, who gradually began to acquire this sport and practice it in the neighbourhoods during their free time. This is also the case with volleyball, and the British forces introduced these sports into school activities in schools that were Limited at that time and follow-up training on it. After that, Basra witnessed the first football match between the Al-Rafidain and Al-Mina teams, and since then football has become the most widespread sport in the city. Basra is distinguished by several sports clubs, including Al-Zawraa Club, which is considered one of the most popular clubs in Iraq, and there is also the Iraqi Student Club. The Iraqi Police Club and the Oil Club of the South Oil Company. The city also witnesses the holding of many sports competitions and tournaments, including the Iraqi Premier League, the Iraq Cup and the Arab Clubs League, the most recent of which is the Gulf Cup in 2023. A number of international sports tournaments have also been organized in Basra, such as Cycling Championship and International Tennis Championship by Ahmed S.S. [2].

4. Evaluation of the Shatt al-Arab Corniche development project and the surrounding area for the year 2022

In 2022, the local government of Basra Governorate decided to restore and rehabilitate the Corniche in cooperation with AL-Sahel Iraq Company, starting from the presidential palace complex to the Central Bank building, which about 3km long. Work was done on rehabilitating the infrastructure for sanitation and rainwater, in addition to the water and electricity network.

Natural stone was used for paving the sidewalks. The Corniche sidewalk was also expanded towards the Shatt al-Arab waters. Basalt stone was used for paving the streets, and the encroachments on the Corniche area were removed.

The selected part of Shatt al-Arab Corniche is located between the two inland rivers Basra city, Al-Ashar River and Al-Khoura River. The features of this part of Corniche were changed at the end of the Ottoman rule and the beginning of the British occupation in the period from 1919 to 1929. In 1940, the Corniche Street was designed included the road from the Lion of Babylon Square, located on the right bank of the Ashar River along the Shatt al-Arab Reaching the Khoura River and Ghazi Bridge the project was implemented in 1941. Then the old Corniche was linked to the new one which opened in the late 1970s with a small bridge on the Khoura River (Armin Sarkis, 2019). Then the surrounding area is located between Al-Kunish and Al-Istiklal Streets, and the Al-Ashar and Al-Khora rivers as shown in fig.3.

Fig.3. Study area boundary

4.1 Improving accessibility

1. Reduce traffic

To reduce the crowd of the movement that the area was facing for the reason of one bridge existence, which is the old Tanuma Bridge locate at the end of Al-Ashar sub-river, connecting Shatt Al-Arab two sides, a new bridge was constructed in the name of the martyr Muhammad

Baqir Al-Sadr and it was opened in 2017. Al-Corniche and AL-Watan streets are one way direction this solution reduce traffic at Al-Corniche Street.

2. Walking and cycling paths

There are no separate paths for pedestrians and cyclists with clear boundaries and traffic signals, except for the wide area of the new Corniche sidewalk overlooking the beach, but this area does not include paths separated for pedestrians and cyclists.

3. Shared streets

The city generally does not contain shared streets that include paths for cars, bicycles and pedestrians, with the safe separation of its borders.

4. Connected urban core

Integration core is located in Al-Ashar area, Al-Watan and Abdullah Bin Ali Streets, and Al-Corniche Street, parallel to Al-Watan Street, these streets include recreational and commercial uses that attract residents and encourage practicing physical activity such as walking or cycling (as shown in figs.4 and 5).

Fig.4. Relation between integration core and entertainment features

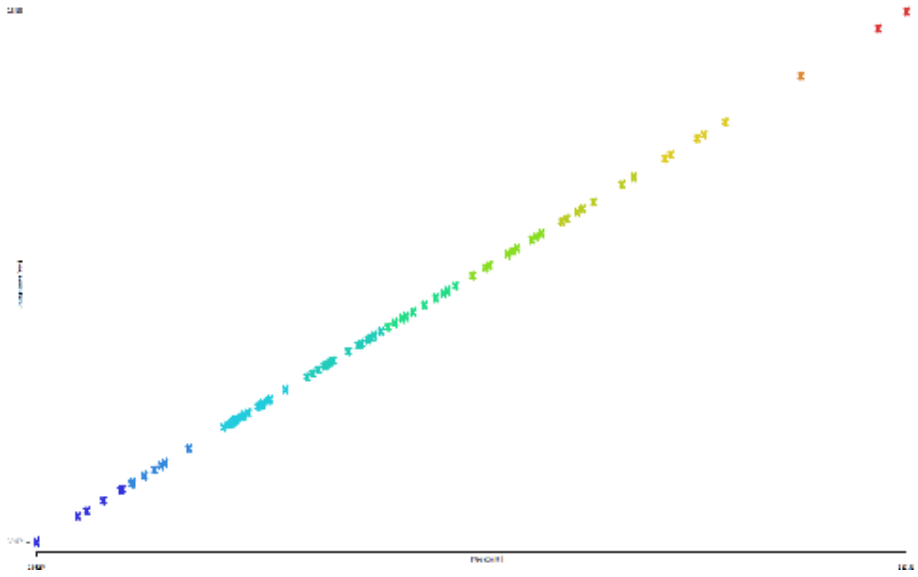

Fig.5. Incremental values of the degree of comprehensive integration using DepthmapX program

5. Mix use

The area has diversity use, as a commercial centre for shopping, it also contains medical complexes and schools and hotels, in addition to Government and religious buildings. And finally the residential buildings (as shown in fig.6).

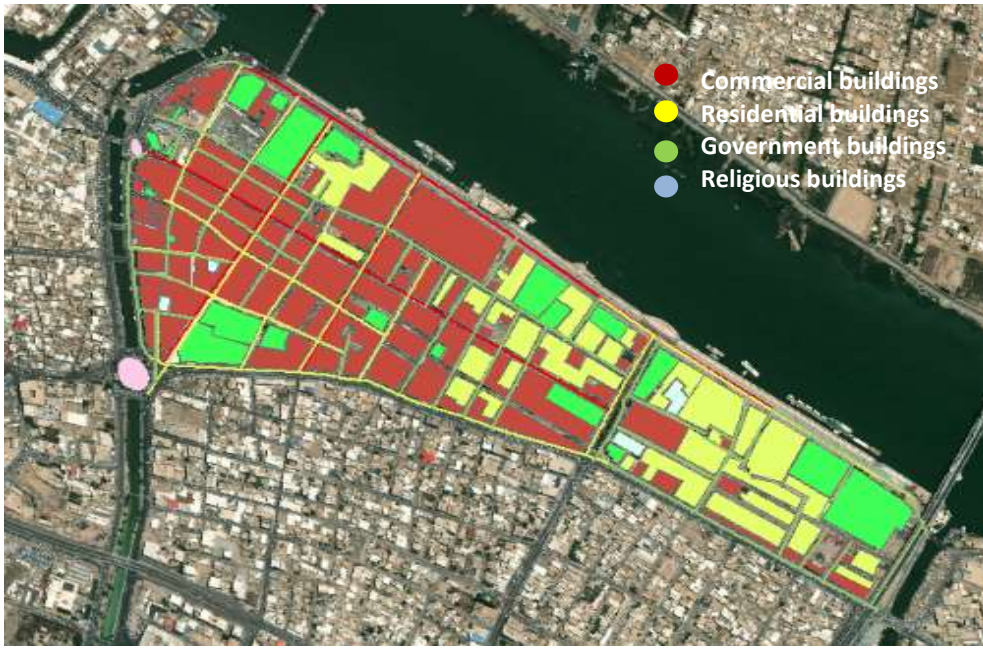

Fig.6. land use and street layout in the study area.

6. Public spaces boundaries

Public spaces boundaries are obvious and clear, but in order to stimulate physical activity and due to the lack of public parks, some unnecessary barriers must be removed to make some public sector buildings gardens become shared with residents outside official working hours.

4.2 Promoting the amenities

1. Adequate lighting :The area has appropriate lighting, which enhances the feeling of safety.

2. Seating, shaded area and trash cans :Al-Corniche Street include seating and shaded areas and trash cans, while the rest of the area facing lack of this type of street furniture.

3. Public facilities: The area does not contain public restrooms, which is necessary to enhance the feeling of comfort in public areas.

4. Sport equipment in open spaces: There is no sport equipment in study area.

4.3 Increasing community awareness

Raising awareness of the use of soft policy by adopting a vision for the city that supports physical activity: The local government did not adopt any active urban design vision in city development that support enhancing physical activity of residents.

Encourages the revival of traditional folk sports: There are no special spaces that encourage traditional sports, in addition to the poor conditions of the city's internal rivers, which discourages the practice of transportation using boats or what is known locally as minnows.

5. Results and Discussion

Development urban projects in Study area in Basra city improved accessibility by reducing traffic, and providing connected urban core and mix uses. But did not design walking and cycling paths that integrated with public transportation, nether shared streets and did not remove public spaces unnecessary boundaries. And regarding to promoting the amenities adequate lighting provided, seating and shaded areas, trash cans were provided in Al-Corniche Street, but there is no public facilities nether sport equipment in open spaces. And finally regarding to increasing community awareness there is no stimulating vision for activity adopted by the local government, and there are no awareness campaigns regarding the necessity of including activity in aspects of the daily lives of residents, nor is there any promotion of reviving the sporting cultural heritage for practicing inherited popular sports.

6. Conclusions

There is an application of the principles of active urban design in city development projects to some extent, but in an unconscious way. Therefore, attention must be paid to providing separated paths for cyclists and pedestrians, especially in open spaces, public squares, and recreational areas, in addition to sports equipment. Also, consideration must be given to adding some streets. Shared design of the city and its connection with public transportation, in addition to providing public facilities and shaded seating areas to enhance amenities. As for the awareness aspect, the local government, in addition to civil society organizations, must adopt clear visions for a city that is more activating the daily physical activity of its residents and direct towards reviving popular sports and others by providing the appropriate environment.

WORKS CITED

Ad de Bont; and Anouk D.; and Wendy V.K.; and Tess B.; and Frits E.; and Sjoerd F.; and Rick G.; and Stijn K.; and Maarten L.; and Martijn N.; and Milan O.; and Jessica T.A.; and Josje M.V.(2017). The Active City. Retrieved July 21, 2024, from https://www.urhahn.com/wp-content/uploads/The-Active-City-2017-10-10-lowres.pdf.

Ahmed S.S. (2015).The history of the sport movement in Basra from 1921 – 1958. Department of History, University of Basra.

Alan W. (1979). An Introduction to Ecological Psychology. Brooks/Cole Publishing Company, California.

Armin S.M. (2012). Documenting the architecture of foreigners in the city of Basra for the period 1914 to 1958 and explaining its role in local architecture. Department of architectural engineering, University of Technology.

Armin S.M.; and Batool M. (2019). Sustainability of architectural heritage elements, An Applied Study of the Basra City Corniche from the Establishment to the Present .IOP Conference Series Materials Science and Engineering (ICEAT 2019), United Kingdom.

Azmi Z.Z. (2017). Applying human aspects in developing city centres, A Case study of Hebron City, department of Architectural engineering, An-Najah National University.

Chanam Lee; and Anne V.M. (2004).Physical Activity and Environment Research in the Health Field: Implications for Urban and Transportation Planning Practice and Research. Journal of Planning Literature, 9(2):147.

Christine M.H.; and Laura K.B.; and Ross C.B.; and Susan L.H.; and Richard K. (2003). Opportunities for Integrating Public Health and Urban Planning Approaches to Promote Active Community Environments. American Journal of Health Promotion, AJHP 18(1):14-20.

Daniel S. (1992). Establishing and Maintaining Healthy Environments: Toward a Social Ecology of Health Promotion. American Psychologist, 47(1):6-22.

David P. J.; and Amy S.H. (1999), Home and Recess Physical Activity of Hong Kong Children. Res Q Exerc Sport,70(3):319-23

Emmanuel S.; and Moushumi C. (2008).Temporal trends in adults' sports participation patterns in England between 1997 and 2006: the Health Survey for England, British Journal of Sports Medicine, 42(11):901-8

Firas A.Q.; and Bozhan H.; and Anna S. (2018). Old Basra Conservation and Development Plan, Research gate, 10.13140/RG.2.2.15486.74560.

Hamed, T.H. (1997(. Changing the urban fabric of the city of Basra in the twentieth century, an analytical study of residential urban variables, department of Architectural engineering, Baghdad University, 36-44.

Jane J. (1961). The Death and Life of Great American Cities. Random House, NY.

Khairi A.; and Mohamed G.A.; and Gehan S. (2005). Walkability in Historic Urban Spaces: testing the Safety & Security in Martyrs' Square in Tripoli. International Journal of Architectural Research Archnet-IJAR, 11(3):163.

Lucia B. (2021). Tomorrow city. Retrieved May 22, 2024, from https://www.tomorrow.city/ville-radieuse-city/

Peggy E.; and Agis D.T. (2008). A healthy city is an active city: a physical activity planning guide. World health organization, Regional Office for Europe. Retrieved July 21, 2024, from https://iris.who.int/handle/10665/341088.

Philip C.; and Keith B.; and Joseph C.; and Paul F.; and Matthew L.; and Rob H.; and John F.; and Kay T.; and Dave M.; and Helen C.; and Gary P.; and Tony A.; and Carl P.; and Andre P. (2015).Active Design Planning for health and wellbeing through sport and physical activity, Public Health England.

Rana M.M.; and Kameelah A. (2020). Active housing design that supports health. IOP Conference Series Materials Science and Engineering (ICEAT 2020), Assiut, Egypt.

Sara W.; and Cynthia C.; and Abby Ck.; and Robyn H.; and Ross C.B.(2000). Determinants of leisure time physical activity in rural compared with urban older and ethnically diverse women in the United States. Epidemiology and Community Health, 54(9):667-672.

Simon B.; and Johannes C.; and Jan E.; and Ulrich B.; and Filip M. (2021). The Role of Physical Activity-Related Health Competence and Leisure-Time Physical Activity for Physical Health and Metabolic Syndrome: A Structural Equation Modeling Approach for German Office Workers. International Journal of Environmental Research and Public Health (IJERPH), 18(19):10153.

Sport England (2005). In Author3, Active Design The Role Of Master Planning Phase 1. Retrieved May 21, 2024, from https://sportengland-production-files.s3.eu-west-2.amazonaws.com/s3fs-public/active-design-phase-1-sept-2005.pdf.

T Takano; and K Nakamura; and M Watanabe (2002). Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. Epidemiology and Community Health, 56(12):913-8.

UN Habitat (2020), Basra Urban Profile. Retrieved May 22, 2024, from https://unhabitat.org/sites/default/files/2021/03/basra_urban_profile_-_english.pdf.