The role of diversity in achieving the concept of urban space humanization (Three Levels of Urban Space in the City of Kufa case studies: Regional, Sectoral, Neighbourhood)

Hussein A. Al-Ansari[1]*, Ahmed S. Al Al-Khafaji[2]

[1]*Faculty of Physical Planning, University of Kufa, Al-Najaf 54001, Iraq*
Email: husseina.alnaddaf@student.uokufa.edu.iq
[2]*Faculty of Physical Planning, University of Kufa, Al-Najaf 54001, Iraq*

* Correspondence: Hussein A. Al-Ansari husseina.alnaddaf@student.uokufa.edu.iq

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Abstract

Humanization is a concept of different human needs and requirements for health, safety, comfort, and psychological well-being within the city. It is in the interest of sustainability. The responsibility for providing these needs and requirements within the city is urban space. The research examines the role of diversity within urban space in reaching the concept of humanization, in an effort to identify the most important indicators of diversity that achieve the concept of humanization. The research has identified five indicators of diversity (diversity of land uses, diversity of land cover, diversity of the user's desired activities, diversity of space users, and diversity of modes of transport). These indicators affect different human needs for staying, spending time, and enjoying within urban space, and affect different human needs for health, safety, comfort, and psychological well-being. These indicators were applied to the study area, three urban spaces representing different levels in the city of Kufa, Iraq. The research revealed a gap in the realization of indicators at different levels of urban space.

Keywords:

Humanization; Diversity; urban space; Humanized urban space

Humanization is one of the important concepts presented in the scientific arena because this concept deals with man and his considerations and needs and all that will enhance his presence and self-existence. After all, man is the best asset and all the interests are centered around him. All scientific fields tend to place human beings as their priority, and the planning area is one of these areas that are more human-friendly 0000.

The concept of humanization is not born of the moment in the field of city planning Since it has a basis, and this basis has seemed obvious to planners and architects opposed to the ideas of modernity. Considering that these ideas are destructive to the public life of the city as they replace the diversity and complexity of the public life of the city with another traditional, scattered ideal that consumes more space and separates uses and distances them Which promotes the use of private cars, reduces walking and generates public spaces for the city with little or no human density, which essentially serves mobility without being in it and does not permit the exercise of various activities and events, They describe it as dead spaces, as it is a man who gives life to public urban spaces. A new concept that has emerged against dead urban spaces has begun to move towards a humane urban space that attracts people and meets their different needs 0000.

The Iannillo & Fasolino 2021 study focused on the diversity of land uses as a tool in the sustainability of urban settlements and the realization of benefits to the social, economic, and environmental system. The diversity of uses resulted in closer distances between housing, workplaces, leisure, facilities, and services, which helped to use active modes of mobility that promoted human health such as walking and cycling. The study aims to identify one or more indicators capable of representing the diversity of uses by applying them to different regions. The study found that some indicators are more effective than others in representing the phenomenon of diversity, and the study showed that proper planning brings important advantages to the human good 0.

Almahmood M., et al., 2022 This study examined the re-humanization of urban spaces to reach an inclusive urban environment that supports the presence of men and women together in the public urban space of Riyadh City the most gender-segregated cities. The study found that the adoption of the Global Guidelines for the Restoration of Humanization on Cities was insufficient to create an inclusive public urban environment as societal and religious norms and traditions affected public space through gender segregation, resulting in women's exclusion 0.

Shostak H 2018 Study Humanized Cities as an Accessible Goal by Creating a Barrier-Free Urban Environment for People with Limited Mobility (Persons with different disabilities, older persons, pregnant women, preschool children, pregnant persons, their children in their arms or vans). The study included a series of steps to shape a path adapted to the urban environment of persons with limited mobility. The study found that the humanization of cities is the new direction of the city's development to reach a city that is comfortable to live and work for its citizens and that the formation of the pathway for people with limited capacity is an effective tool for adapting the urban environment to the needs of this group 0.

Korshunova N., et al. 2020 The study examined modern spatial development methods whose main objective is the humanization of the city and specialized in the field of sustainable mobility and access to all its regions and infrastructure using a sustainable urban mobility plan (SUMP), which is based on the principles of sustainable development and cross-sectoral integration. Thus, the study found that the new concept of sustainable mobility refers to human freedom of movement that is not harmful to the environment and people's health, takes into account the interests of future generations, and considers SUMP as an effective tool in urban development 0.

Hadi & Alwan 2021 study addressed the humanization of cities through urban streets to enable walking within the streets of the old city of Najaf. The research included a set of indicators applied to the study area: connectivity, accessibility, mixed land use, comfort, protection, gravity, vitality, and human scale). To know the old Najaf City Center's potential to be pedestrian friendly and calculate the percentage of its humanization. The study found that streets in the city center varied in their attainment of the city's humanized indicators and needed improvement 0.

After reviewing previous recent studies, it was found that they specialized in several aspects, both in sociology and mobility, and addressed several characteristics and indicators in the concept of humanization, while current research attempts to determine the relationship of diversity only with the humanization of urban spaces. The problem of research has therefore been the blurring of the relationship between diversity and the humanization of urban spaces, to reach a humane urban space. Research assumes that diversity includes effective indicators for the humanization of urban spaces.

2. Diversity indicators for the humanization of urban space

Diversity is a multidimensional phenomenon that promotes more desirable urban characteristics 0, enhances options within urban space, and that diversity is seen as an indication of the quality of space to attract human beings through the range of interrelated events offered by urban space, and that diversity is complex enough to stimulate communication between humans, enhance the public life of the street and create an attractive space for people 0.

2.1 Diversity of land uses

It means the various and multiple functions that are incorporated into a specific combination and with a density suited to urban space so that this mixture allows people to live, work, shop, and rest in one place [15]. The diversity of uses is a key indicator in achieving sustainability and physical active mobility. Studies have found that blending uses by providing housing, workplaces, education, comfort, etc. Combined, reduces journeys using the car and increases the likelihood of trips using walking and cycling, and makes the place safer [16] [17]. The diversity of uses can be measured by the Entropy Index, which ranges in value from 0 to 1, below the Formula for the entropy index 0.

$$\mathrm{ENT} = -\Sigma^N P^j \ln(p^j) / \ln(N) \quad (1)$$

$$j{=}1$$

where:

P^j: Percentage of each use within the region

N: Number of land uses

2.2 Diversity of land cover

The state of balance between physical and natural spaces. Increasing physical spaces at the expense of natural spaces within urban spaces lead to a sense of monotony. Balancing them gives users a better public life, a sense of comfort, and greater attractive opportunities for humans within space 0. This diversity of natural and physical coverage has different effects on human psychological and physiological well-being 0. The diversity of land cover can be measured by the Shannon-Wiener Index, with a value of between (0-1), and the Formula below 0 0.

$$H' = -\Sigma^N P^i * \log_2(P^i) \quad (2)$$
$$\scriptstyle i=1$$

where:

P^i: Area ratio for land cover type i

N: Number of types of land cover

2.3 Diversity of the user's desired activities

It means different activities depending on the user's destination, which follows the user's desire 0, as people flock to sustainable and vibrant urban environments to undertake diverse and complex activities to meet their pleasure and entertainment needs 0. According to the Lycert Scale (5-point Likert- Scale) the diversity of activities desired by the user can be measured. The scale consists of five points starting with (1) indicating (I disagree strongly), and ending with (5) indicating (I agree strongly) 0.

2.4 Diversity of space users

Multiple users from different areas of the city attract them at different times of the day 0, which includes spatial diversity and time diversity of users. Spatial diversity shows that space attracts users from different urban areas. Time diversity shows that space attracted users at different times of the day 0. According to the Licert scale (5-point Likert- Scale) the diversity of space users can be measured 0. As in the previous indicator.

2.5 Diversity of modes of transport

Multimodal mobility occurs such as walking and cycling based on physical activity, public transport such as buses and trains, or private transport. The choice of mode of mobility depends on several factors such as travel distance, estimated travel time for arrival, cost, safety and comfort 0. Human-oriented public spaces give modes of transport different proportions of spaces, with the largest share of urban space being for walking and cycling modes and preventing or reducing as much as possible private cars to provide a healthy human space with less pollution and more physical and human activity 0. Relying on (13) examples of urban streets and (7) examples of urban plazas or parks in various parts of the world that have been redesigned to be human-oriented, the average proportions of spaces allocated to each medium within streets, squares or parks can be produced 0. As in tables (1) and (2).

Table (1) Proportions of modes of transport within human-oriented urban streets

	Case study	Proportions of modes of transport from the total area of streets after the redesign			
		🚶	🏃	🚌	🚗
1	Fort Street, Auckland, New Zealand	69%	15%	0%	16%
2	Van Gogh Walk, London, United Kingdom	51%	18%	0%	31%
3	Bourke Street, Sydney, Australia	36%	14%	27%	23%
4	St. Mark's Road, Bangalore, India	45%	11%	19%	25%
5	Second Avenue, New York City, USA	30%	11%	46%	13%
6	Götgatan, Stockholm, Sweden	36%	40%	12%	12%
7	Swanston Street, Melbourne, Australia	56%	17%	27%	0%
8	Boulevard de Magenta, Paris, France	47%	11%	23%	19%
9	Avenida 9 de Julio, Buenos Aires, Argentina	54%	0%	14%	32%
10	A8ernA, Zaanstad, The Netherlands	81%	7%	4%	8%
11	21st Street, Paso Robles, USA	43%	30%	0%	27%
12	Jellicoe Street, Auckland, New Zealand	63%	0%	15%	22%
13	Queens Quay, Toronto, Canada	49%	11%	21%	19%
	Ave.	**51%**	**14%**	**16%**	**19%**

Table (2) Proportions of modes of transport within squares or human-oriented parks

	Case study	Proportions of modes of transport from the total area of the public square or park after the redesign			
		🚶	🚴	🚌	🚗
1	Strøget, Copenhagen, Denmark	100%	0%	---	---
2	Superkilen, Copenhagen, Denmark	86%	14%	---	---
3	Columbia Heights Civic Plaza, Washington, USA	100%	0%	---	---
4	General Gordon Square, London, United Kingdom	100%	0%	---	---
5	Canada Square, London, United Kingdom	100%	0%	---	---
6	Spiral Hilltop, Sydney, Australia	63%	37%	---	---
7	Rålambshovsparken, Stockholm, Sweden	91%	9%	---	---
	Ave.	**%91**	**%9**		

Table 3 shows the diversity indicators for the humanization of urban spaces and measurement methods with the approved standards.

Table (3) Diversity indicators for the humanization of urban spaces

characteristic	indicators		measurement methods	standards
Diversity	diversity of land uses		Entropy Index	1-0
	diversity of land cover		Shannon–Wiener index	1-0
	diversity of the user's desired activities		5-point Likert- Scale	(2-1)The diversity of activities within the space is not desired by the user (3-2.1)The diversity of activities desired by the user within the space is weak (4-3.1)The diversity of activities desired by the user within the space is moderate (5-4.1)The diversity of activities desired by the user within the space is good
	diversity of space users	Spatial diversity of users		(2-1) No spatial diversity of users (3-2.1)Poor spatial diversity of users (4-3.1)Moderate spatial diversity for users (5-4.1) High spatial diversity for users
		Time diversity of Users		(2-1)There is no time diversity for users (3-2.1) Poor time diversity for users (4-3.1)Moderate time diversity for users (5-4.1)High time diversity for users
	diversity of modes of transport	Walking in urban space	The ratio of its area to the total area	(51%)in urban streets (91%) in public squares or parks
		cycling in urban space		(14%) in urban streets (9%)in public squares or parks
		public transport in urban space		(16%) in urban streets
		private transport		(19%) in urban streets

		in urban space		

3. Methodology

After reviewing many previous recent studies in the concept of humanization, the knowledge gap was identified, the problem was presented and the research aim, and the hypothesis was adopted by which the research objective could be reached. The analytical descriptive curriculum was adopted by collecting data from the relevant departments and institutions in the city of Koufa (Municipal Directorate, Directorate of Urban Planning). According to this data, the indicators of diversity were applied through descriptive methods (field observation and identification) and the quantity (mathematical models) and using the GIS program to achieve accurate results compared to the standards of humanization. Figure (1) illustrates the methodology followed.
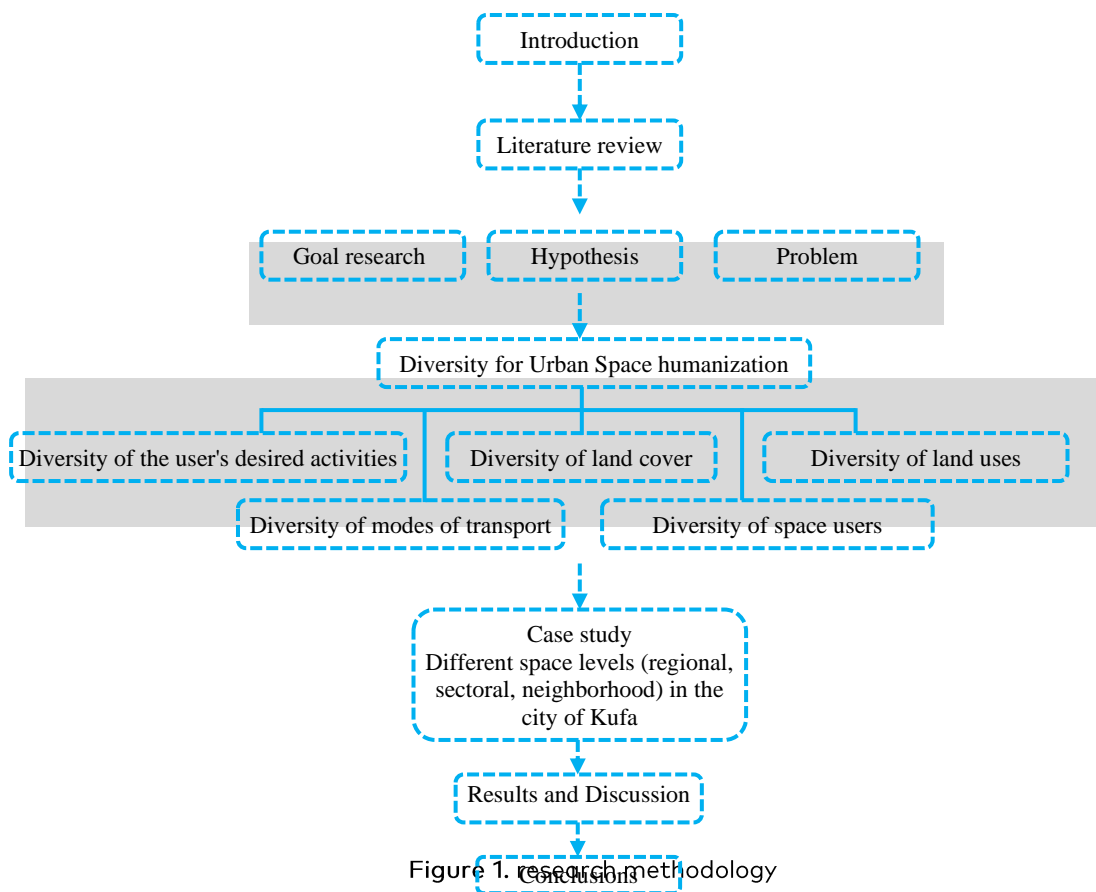

Figure 1. research methodology

4. Case study

The city of Kufa enjoys different levels of urban space, the nature of its spaces is different from space to space, the majority of which is untapped to meet human needs, with most of its space specifications applying to the concept of dead space. They were spaces dominated by vehicle traffic more than pedestrians, not only supporting man's presence but only passing and moving through it, not giving a positive contribution to man and being repellent rather than attractive 0.

Three urban spaces in the city of Kufa were elected to represent different levels (regional, sectoral, and neighborhood), where the regional space level serves different urban centers, while the sectoral space level serves a group of residential neighborhoods in the city, and the neighborhood space level serves one residential neighborhood. As in figure (2)
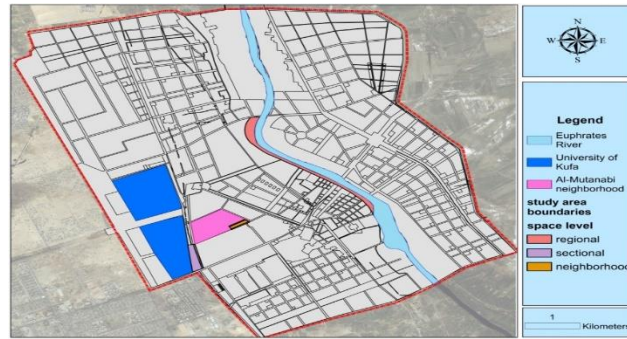
5. Results and discussion of the analysis of diversity indicators in the study area

5.1 Diversity of land uses

The diversity of uses can be measured if it exists or if there is dominance of a use through the Entropy Index at the three space levels, as follows:

5.1.1 Diversity of uses at the regional space level

After conducting the field study and applying the mathematical formula of the entropy index by area and number of uses that limit space, diversity was found to have reached 0.76, so the value reflects good diversity that enhances space vitality and supports human presence within space, as shown in table (4) and figure (3).

Table (4) Diversity of use within regional space by entropy index

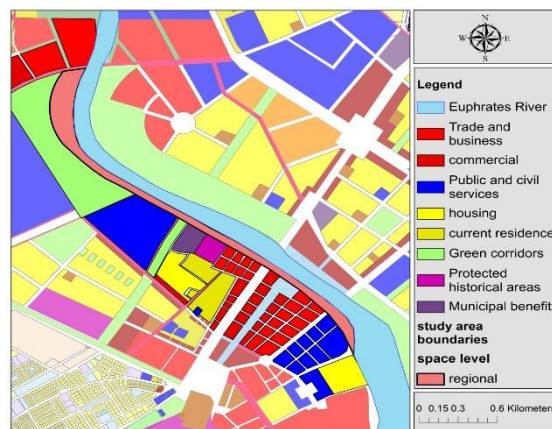| K	Usage Type	%	Pj	Pj ln(Pj)
1	Blue Zones	40	0.40	0.36
2	Commercial	18.5	0.185	0.31
3	Green	18.5	0.185	0.31
4	Public and civil services	12	0.12	0.25
5	Municipal Benefits	2	0.02	0.07
6	Historic Protected Areas	2	0.02	0.07
7	Residential	5	0.05	0.15
8	Sedentary Areas	2	0.02	0.07
ENT=0.76				

Figure 3. Diversity of use within regional space

3.1.2 Diversity of uses at the sectoral space level

After conducting the field study and applying the mathematical formula of the entropy index by area and number of uses that limit sectoral space, diversity was found to have reached 0.67, as the value expresses an acceptable diversity, but nevertheless, this diversity is not feasible as it is limited to only three types. (residential, educational, open space) and irregular distribution where western space boundaries are inactive because there are no commercial uses and are limited to a single use (educational), and this diversity lacks such species as culture and recreation, thus all of the above negatively affects the vitality and effectiveness of space and the opportunities to attract and meet human survival needs, as illustrated in the table (5) and figure (4).

Table 5. Diversity of use within sectoral space by entropy index

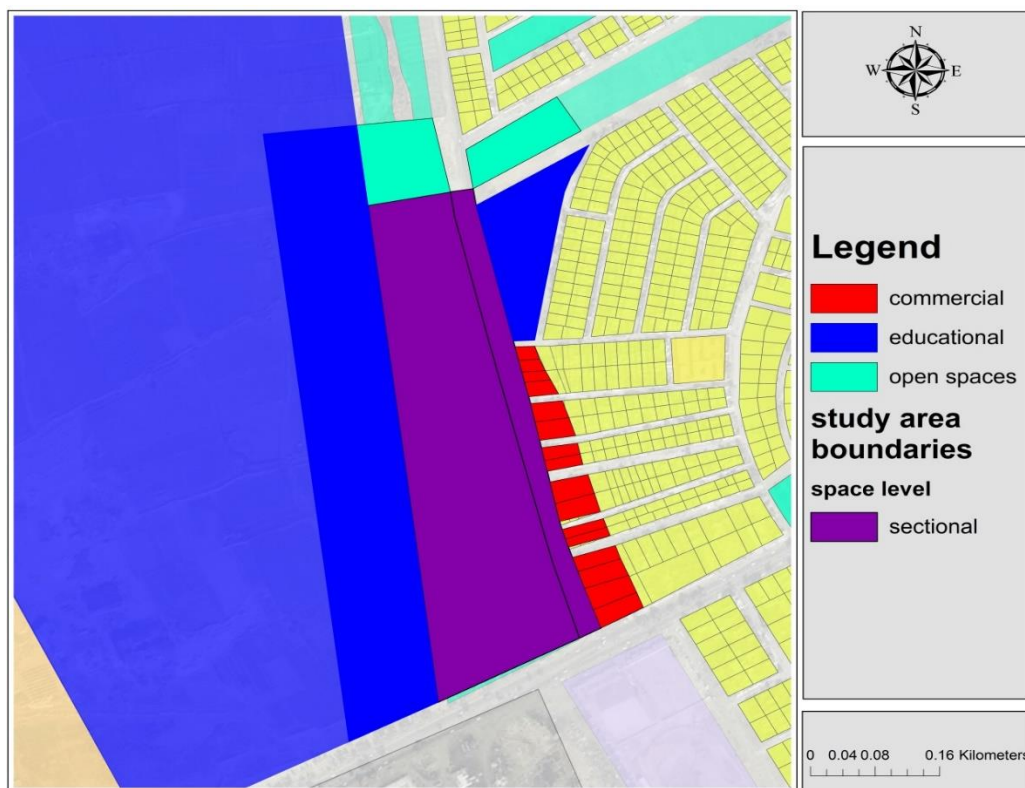| K	Usage Type	%	Pj	Pj ln(Pj)
1	Educational	74	0.74	0.22
2	Commercial	13	0.13	0.26
3	Open Space	13	0.13	0.26
ENT=0.67				

Figure 4. Diversity of use within sectoral space

3.1.3 Diversity of use in the neighborhood's space level

After conducting the field study and applying the mathematical equation of the entropy index by area and number of uses that limit the neighborhood's space, diversity was found to have reached 0.89. The value, therefore, reflects a good diversity of uses that enhance the vitality of space and give human beings opportunities to exist, stay within space, and conduct

their activities, as shown in table (6) and figure (5).

Table (6) Diversity of use within neighborhood space by entropy index

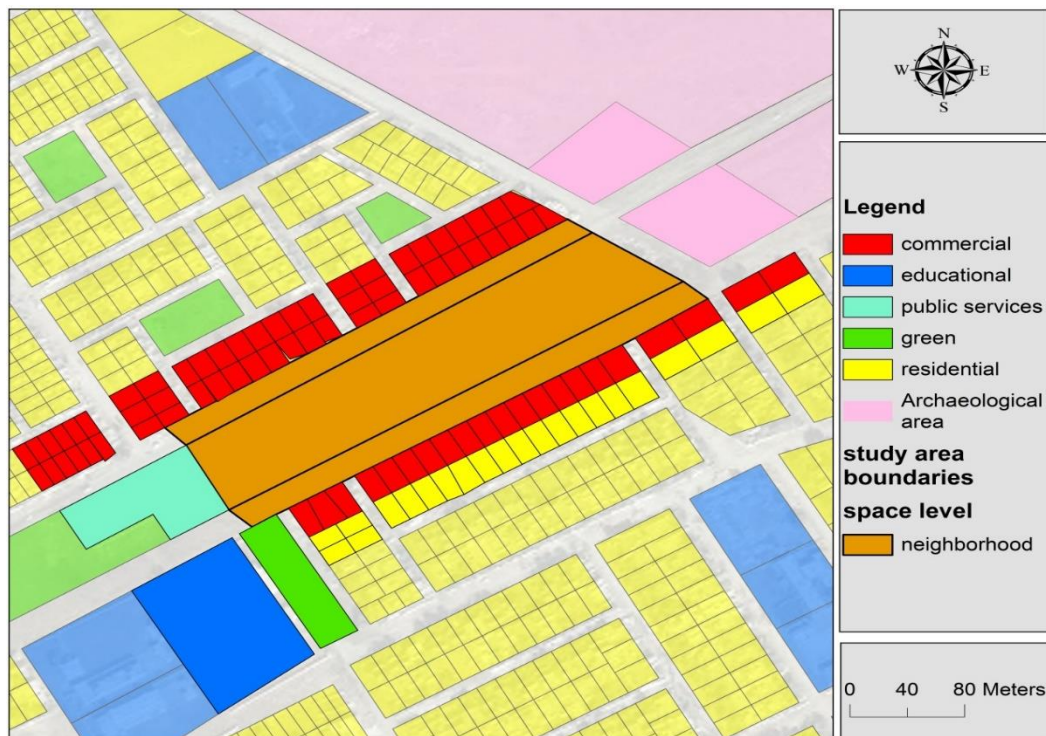| K	Usage Type	%	Pj	Pj ln(Pj)
1	Residential	15	0.15	0.28
2	Educational	15	0.15	0.28
3	Public services	12	0.12	0.25
4	Green	5	0.05	0.15
5	Archaeological Conservation Zone	16	0.16	0.29
6	Commercial	37	0.37	0.36
	ENT=0.89			

Figure 5. Diversity of use within neighborhood space

5.2 Diversity of land cover

This indicator identifies the state of balance or diversity between natural and physical areas within urban space and its surrounding boundaries, where it will be measured at the three space levels and according to the Shannon-Wiener Index, as follows:

5.2.1 Diversity of land cover at the regional space level

After conducting the field study and applying the mathematical formula of the Shannon-Weiner Index and depending on the physical and natural coverage area within the regional space, the physical-natural diversity was found to have reached 0.98. Space has natural green and blue spaces that correspond to physical spaces and thus reflect the value of high physical-natural diversity that gives users a better public life that is liveable, comfortable and has greater attractive opportunities for humans within space. This diversity has positive effects on human psychological well-being, as shown in table (7) and figure (6).

Table (7) Diversity of land cover within regional space by Shannon Weiner Index

N	Coverage Type	%	Pi	Pi log2(Pi)
1	physical	50.5	0.505	0.497
2	Natural	49.5	0.495	0.502
H'=0.98				

Figure 6. Diversity of land cover within regional space

5.2.2 Diversity of land cover at the sectoral space level

After conducting the field study and applying the mathematical formula of the Shannon Wiener Index and depending on the physical and natural coverage area within and within the sectoral space, the physical-natural diversity was found to have reached (0.49), as value reflects weak and unbalanced physical-natural diversity due to the dominance of physical coverage over natural coverage. As a result of this combination of sectoral space, it has some negative effects on human psychological well-being and does not enhance its value as a point of attraction for users, as shown in table (8) and figure (7).

Table (8) Diversity of land cover within sectoral space by Shannon Weiner Index

N	Coverage Type	%	Pi	Pi log2(Pi)
1	physical	89	0.89	0.14
2	Natural	11	0.11	0.35
H'=0.49				

Figure 7. Diversity of land cover within sectoral space

5.2.3 Diversity of land cover at the neighborhood's space level

After the field study and the application of the mathematical formula of the Shannon Weiner Index and by the physical and natural coverage area located within and within the neighborhood space, the physical and natural diversity was found to have reached (0.82), as value reflects good and balanced physical-natural

diversity that provides greater attractive opportunities for humans within space and gives positive effects on human psychological well-being, as shown in table (9) and figure (8).

Table (9) Diversity of land coverage within and within neighborhood space by Shannon Weiner

Index				
N	Coverage Type	%	Pi	Pi log2(Pi)
1	physical	74	0.74	0.32
2	Natural	26	0.26	0.50
H'=0.82				

Figure 8. Diversity of land cover within neighborhood space

5.3 Diversity of the user's desired activities

Represents the multiple choices of essential activities and services intended and desired by the user in urban space. According to the Lecert Scale (5-point Likert- Scale), a questionnaire was prepared for the purpose of testing the user's desired activity diversity index and the results were achieved in the three levels of urban spaces as follows:

5.3.1 Diversity of the user's desired activities at the regional space level

The value (2.7) means that the variety of activities desired by the user is weak, which negatively affects the attraction and presence of human beings within space.

5.3.2 Diversity of the user's desired activities at the sectoral space level

The value (3.2) has reached. The value means that the variety of activities desired by the user is moderate, which helps to somewhat attract the human presence within space.

5.3.3 Diversity of the user's desired activities in the level of neighborhood space

The value is (2.9). The value means that the variety of activities desired by the user is weak, which negatively affects the attraction and presence of humans within space.

5.4 Diversity of space users

Attractiveness of users at different times of the day and from different areas of the city, according to the Lectert scale (5-point Likert- Scale). A questionnaire was prepared for the purpose of testing the users' temporal and spatial diversity index and the results were achieved at the levels of the three urban spaces as follows:

5.4.1 Diversity of space users at the regional space level

The result of spatial diversity (4.1) means a high spatial diversity of space users, which means that space includes users from diverse, dispersed and well-rounded regions and thus positively affects human communication and social interaction within space. The result of time diversity is (3), which means a weak temporal diversity of space users, which means that space at times of the day does not have users or has very little presence, which means that it does not attract users at different times of the day at the same attraction rates and therefore negatively affects the vitality of

space and does not meet human requirements at all times.

5.4.2 Diversity of space users at the sectoral space level

The diversity of space users in the sectoral space level: the result of spatial diversity (2.9) means a weak spatial diversity of space users, which means that attracting space for users from diverse and scattered regions is weak and thus adversely affects human communication and social interaction within space. The result of time diversity is (3), which means a weak temporal diversity of space users, which means that space at times of the day does not have users or has very little presence, which means that it does not attract users at different times of the day at the same attraction rates and therefore negatively affects the vitality of space and does not meet human requirements at all times.

5.4.3 Diversity of space users in the level of neighborhood space

The result of spatial diversity (2.3) means a weak spatial diversity of space users, which means that attracting

space for users from diverse and scattered regions is weak and thus adversely affects human communication and social interaction within space. The result of time diversity (2.7) means a poor temporal diversity of space users, which means that space at times of the day does not have users or has very little presence, which means that it does not attract users at different times of the day at the same attraction rates and therefore negatively affects the vitality of space and does not meet human requirements at all times.

5.5 Diversity of modes of transport

This indicator examines the media within the three elected urban spaces by measuring and comparing the spaces allocated to each medium with the standard of the concept of humanization, which predominates pedestrian and bicycle spaces at the expense of vehicles where it gives a minimum to pedestrians (51%), bikes (14%) and public transport (16%) of the total area and maximum private vehicles (19%) of the total area. The analysis was as follows:
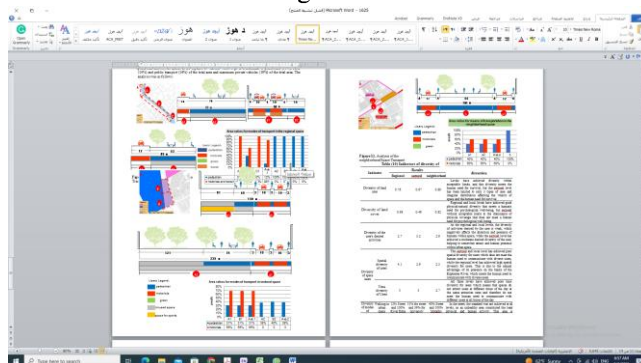

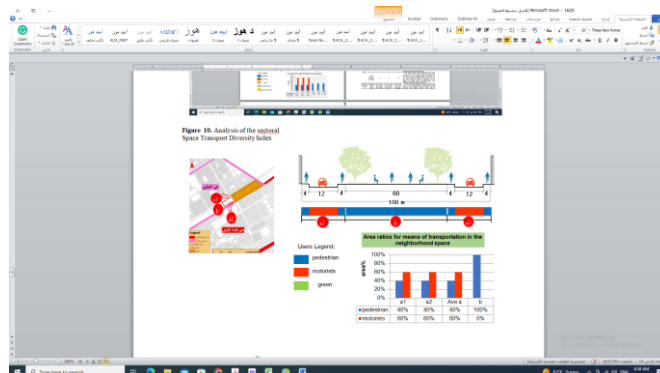Figure 10. Analysis of the sectoral Space Transport Diversity Index

Table (10) Indicators of diversity of urban spaces in the city of Kufa

Indicator		Results			discussion
		Regional	sectoral	neighborhood	
Diversity of land uses		0.76	0.67	0.89	Levels have achieved diversity within acceptable limits, and this diversity meets the human need for survival, but the sectoral level has been limited to only 3 types of uses and irregular distribution affecting the vitality of space and the human need for survival
Diversity of land cover		0.98	0.49	0.82	Regional and local levels have achieved good physical-natural diversity that meets a human's need for psychological well-being, but sectoral without acceptable limits to the dominance of physical coverage that does not meet a human need for psychological well-being.
Diversity of the user's desired activities		2.7	3.2	2.9	At the regional and local levels, the diversity of activities desired by the user is weak, which negatively affects the attraction and presence of humans within space, while the sectoral level has achieved a moderate desired diversity of the user, helping to somewhat attract and human presence within urban space.
Diversity of space users	Spatial diversity of users	4.1	2.9	2.3	The sectoral and local level has achieved poor spatial diversity for users which does not meet the human need to communicate with diverse users, while the regional level has achieved high spatial diversity for users. This is due to the natural advantage of its presence on the banks of the Euphrates River, which meets the human need to communicate with diverse users
	Time diversity of Users	3	3	2.7	All three levels have achieved poor time diversity for users which means that spaces do not attract users at different times of the day at the same attraction rates and therefore do not meet the human need to communicate with different users at all times of the day
Diversity of modes of transport	Walking in urban space	12% Street and 100% River Edge Space	31% for street and 39% for university shoulder space	40% Street and 100% Metalby Neighborhood Space	In the street, the standard was not achieved at all levels, as an unhealthy area constituted the least physical and human activity. This area is unacceptable within the concept of humanization. In the field of space, it was achieved at both the regional and local levels. This is accepted within the concept of humanization.
	cycling in urban space	there is no	there is no	there is no	No support infrastructure is available for the bike medium and this is unacceptable within the concept of humanization
	public transport in urban space	88% subscription (public and private)	there is no	there is no	The criterion for the public and private media combined in the regional space has not been met, with 88% of the total area (35%), while private transport in the sectoral and local space has not achieved the criterion as more polluting areas for humans and the environment have been formed and unacceptable within the concept of humanity.
	private transport in urban space		69%	60%	

6. Conclusions

Humanized urban space is an important planning concept that meets man's different needs for safety, public health, comfort, and well-being.

The feature of diversity in urban spaces can attract and exist human beings in desirable densities over a long period of time through the diversity of uses, activities, users, the diversity of land coverage and the existence of healthy and sustainable modes of transport, creating vital and safe urban spaces that take into account different human requirements.

Modes of transport have a decisive impact on the concept of urban space humanization, as private modes of transport decrease and conversely enhance modes of walking and cycling become human-friendly.

Walking and cycling modes are necessary to create healthy urban spaces that are less polluted and more physically active, as these modes form a sustainable mode of mobility.

The research recommends using the concept of humanization to target groups with limited mobility and mobility, in order to enable them to live freely and more comfortably.

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