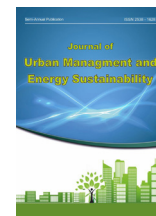


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## ORIGINAL RESEARCH PAPER

### Explanation Of Urban Landscape Architecture Model In Approach To Ecology

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#### ABSTRACT

Urban ecology has been introduced as an interdisciplinary subject that is the intersection of different fields of social sciences and biophysical processes. Natural and man-made spaces as the physical and semantic context of cities, humans with multiple and hierarchical perception and finally the interaction that occurs between humans and the environment, makes the urban landscape as the first manifestation of historical, social- Cultural, economic and natural of each city should be updated and presented. The current research is analytical-descriptive research in terms of its structure, which in terms of its main goal is considered to be of the type of applied and developmental research, which can also be used as an exploratory research approach considering the lack of previous research on the concept of landscape in the field of the city in a methodical way. According to the course of theoretical foundations and conceptional model, the effective factors in the influence of the urban landscape in the field of ecology are considered and by explaining the branch of landscape architecture to it, these factors are tested by experts and elites for indexing using the Delphi method. Are taken so that the framework of the proposed criteria can be presented in chapter one. Based on this, a group of components has the ability to generalize in the direction of conducting research, which includes the assumption of a pair of criteria including ecological and functional values, urban and natural elements, and aesthetic and functional perceptions. on the research findings, framework can be presented as the result of studies, theoretical framework and Delphi method, the important indicators that is affecting the quality of urban landscape architecture quality are Visual scale, Visual clarity, Visual influence, Form feature, Greenness, Aesthetics, Legibility, Size, Proportions, Environmental comfort and sense of place.

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## INTRODUCTION

### *Urban Ecology and Landscape*

Urban ecology as a subset of a more complex and broader concept means that landscape ecology is becoming increasingly important (Arnberger et al., 2022). In fact, urban ecology has been introduced as an interdisciplinary subject that is the intersection of different fields of social sciences and biophysical processes (Budruk and et al., 2009). From the point of view of landscape ecology, the city is a set of disturbed ecosystems and from this point of view its structures, functions and processes can be investigated. “Spots”, “corridors” and “matrix” are the main elements of landscape ecology that Forman and Godron (1986) introduced to describe spatial patterns in natural and rural landscapes (Calheiros et al., 2022). But this was one of the primary methods for studying and evaluating urban ecology. Today, linking different disciplines such as urban sociology with ecology or moving on the boundaries of different sciences is the main idea of some studies (R. T. Dasgupta et al., 2022)

It can be said that the integration of landscape ecology and urban ecology led to a new proposal, which is called urban landscape ecology. Cities are spatially expansive and complex adaptive systems that we call landscapes. Undoubtedly, cities are the main place for the future of human life, so most landscape ecology studies will inevitably focus on cities (Gray, 2017). Wu et al. (2013) simply mention that the study of urban landscape ecology is the same as urban landscape ecology. Specifically, the science of studying and improving the relationship between urban landscape patterns and ecological processes to achieve urban sustainability. To characterize the study areas in urban landscape ecology, these researchers proposed three key components: patterns of urbanization, effects of urbanization, urban sustainability (Fig. 1). In this regard, Modero et al. (2018) reviewed the literature and related research between 1986 and 2016 to clarify the focus of attention in urban landscape studies and extracted the most common terms in urban landscape ecology research, which include landscape ecology, structure Landscape, landscape change, biodiversity, approaches, gradient, vegetation, GIS and remote sensing.

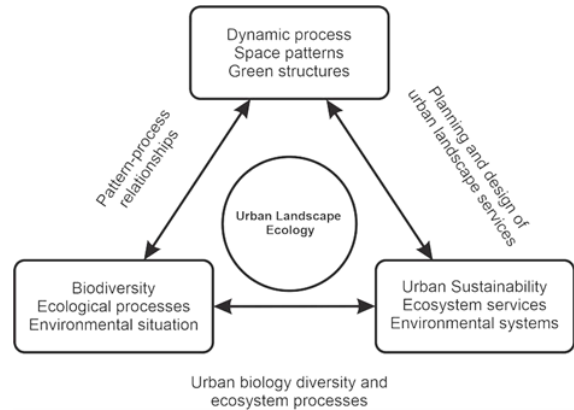


Fig 1: Objective of ecological urban landscape: three elements and their relationships (Wu et al., 2013)

Therefore, it can be said that natural and man-made spaces as the physical and semantic context of cities, humans with multiple and hierarchical perception and finally the interaction that occurs between humans and the environment, makes the urban landscape as the first manifestation of historical, social- Cultural, economic and natural of each city should be updated and presented. As can be seen, the urban landscape is a multidisciplinary concept that includes different sciences and disciplines.

### *Functional Approach in Urban Landscape*

The function of the urban landscape has changed to an important concept in policy making. One of the most important landscape challenges is deciding on the optimal allocation and management of different alternatives and services for land users, which presents a complex problem to various groups of experts, including policymakers, urban planners, urban managers, and landscape architects. Land use management and making the best decision and using the maximum potential of urban spaces is one of the main challenges facing different groups of experts including policy makers, urban planners, urban managers and landscape architects (Kajosaari and Pasanen, 2021). In general, different and sometimes conflicting criteria and the selection of suitable alternatives turn urban landscape policy into a type of multi-criteria decision-making problem (Zhou et al., 2021). A correct and appropriate understanding of the concept of urban landscape performance requires a series

of prerequisites, which are mentioned below. The quality and quantity of activities in an urban environment can affect the stopping and the interaction of people in these spaces. Public spaces provide a setting for the widest range of daily activities to periodical celebrations, individual or collective, active and passive (Thomas et al., 2016). Based on Flower's (1987) classification, activities can be divided into three categories depending on whether they are mandatory or optional: Necessary activities (such as shopping, going to school or work, etc.); optional activities (such as going to the park or movies, swimming, etc.) And the social activities (such as watching others, talking, getting attention, etc.) (Thomas et al., 2016). Necessary activities are performed without connection to the physical environment, while optional activities depend on the qualities provided by the space for people, as well as the activities that motivate them to do it. To the extent that the space is more favorable, more optional activities are performed and the duration of necessary activities increases. Social activities, which include children's play, listening, talking, communicating, and seeing and hearing other people, are the result of the quality and duration of other activities because they occur when people meet in specific situations.

#### *Visual Approach in Urban Landscape*

The policies to achieve responsiveness in the visual and perceptual dimension of the sense of place in urban landscape design can be seen as follows: Defining the urban landscape with visual signs: visual signs are very important for residents and guests to recognize urban landscapes and can define an identity and a specific face, and this feature leads to a sense of belonging to the landscape. (Orr and Wilkinson, 2017) Trying to preserve or create a special face from an urban point of view: in every design, sufficient attention should be paid to various environmental features. Some are physical and bodily characteristics. Some are emotional and meaningful. A thoughtful evaluation of diverse environmental influences helps to create spatial unity, legibility of the environment and recognition of different spaces.

#### *Environmental Approach in Urban Landscape*

In addition to the environmental capabilities and the improvement of spatial advantages, the

presence of different plant species can lead to design ideas. The existence of their different types can be used for creating space. A variety of trees from other species can be used quantitatively and qualitatively to take on various roles from defining to completing the space. In the meantime, it is possible to reach a response in the environmental dimension by complementing the set of urban management policies in relation to the urban landscape and the design of urban spaces. (Manso et al., 2021) Sidewalks and parks should be connected: combining sidewalks and parks is one of the factors that can simultaneously encourage the use of parks in cities, and on the other hand, it can improve the image of the city, which is largely dependent on sidewalks. A greener face. (Lo et al., 2017) Coordination of green infrastructure plans with the city plan: One of the problems in most urban plans is that green plans are not included in city plans from the very beginning. Meanwhile, the importance of paying attention to green spaces requires that the program of green spaces be taken into account in urban plans from the beginning. (Wilson, 2017) The policies to achieve responsiveness in the environmental dimension in urban landscape design can be seen as follows:

1- Visual beauty and continuity of greenery: The geometric order (rhythm) should govern the placement of trees and their visual desirability (visual continuity) should be considered. Also, vegetation can cause color diversity in the space. For example, all kinds of flowers and other vegetation in contrast with the bottom of the walls, produce visual richness. The use of vegetation and water in the design and organization of urban spaces; It has many environmental values 2- Greenness of trees and open space: In this case, the important point in relation to vegetation is to pay attention to their space-building characteristics. Plants are inherently attractive and there is consensus on their desirability. Therefore, their use in urban spaces is thought to guarantee the desirability of such spaces to a large extent.

#### *Urban Landscape Architecture*

The urban landscape, as a whole, of its appearance, has a special importance in establishing the basis for evaluating the visual values of the city. In 1984, Wilson, introduced the factors that contribute to the creation of a

particular landscape, including the following: physical factors (geological landforms, climate, microclimate, drainage, soil and ecology), human factors (archeology, landscape history, land use, buildings and settlements), aesthetic factors (visual factors such as proportion, scale, appendages, texture, color, landscape, other feelings, sound, smell, taste and touch) and connections (Communications) historical factors (history of settlements, special events) and cultural factors (well-known figures of literature (literature and art, music and painting) (Wilson, 1984) visual resources in the landscape to reflect its values As a non-renewable resource, they need to be managed (Williams et al., 2019). Since the 1970s, in the United States, environmental planning laws and guidelines were formulated with an emphasis on visual values, and the short-term and long-term consequences of development on the landscape (Streutker, 2002) In fact, the design of landscape values in professional landscape activities has started since the beginning of the 20th century (Gali et al., 1998). Examples of studies in this regard include the sites of Forestry industry and design of urban open spaces and road landscape evaluation (Berndtsson, 2009). From the beginning of the 1960s onwards, the understanding of visual and aesthetic values was proposed as an interdisciplinary activity in environmental planning on a large scale. Beginning in the 1970s, in the United States of America, NEPA, to respond to the increase in society's attention to the decrease in the quality of the environment caused by the Second World War raised the consideration of visual values during the decision-making process regarding the design of development projects as an interdisciplinary activity. NEPA and the laws and policies contained in it, with the impact of visual values, caused by the growth of reliable methods and processes for determining the value and visual qualities and visual effects, in the concept of sustainable development. Protection and maintenance of visual resources in land use management and planning also started in Canada and until today such activities are increasing (Akbari et al., 2001). Many processes and findings in visual assessment It was introduced and applied based on the laws of the United States of America and was

subjected to testing and experience. Management of visual resources is a process that is used to ensure the recognition and consideration of the visual qualities of the landscape during the environmental management and design process. The purpose of visual resources management is to provide visual and systematic information regarding the visual quality of landscapes and the visual effects of development activities in the landscape. "Environmental Determinism" and "Environmental Enabling" Theory and "Environmental Probability" Theory. The theory of environmental determinants is based on the fact that changes in the nature of geographic, social, cultural environments and natural or artificial built environments can lead to changes in human perception and behavior, and humans are subject to environmental conditions. This theory considers the quality of the environment in urban design as a quality that arises algebraically from the environment and specifically from the form of the environment.

While the environment enabling theory is based on the fact that the environment provides a set of potential abilities for some behaviors, and humans do not surrender to certainty in front of the environment and have a relative choice. Of course, the ability of the environment does not necessarily lead to a specific behavior, but if there is no ability in the environment, then no behavior will be emitted. This theory has considered the quality of the environment in urban design as a completely subjective and tasteful category that is created by the observer and has nothing to do with the structure and characteristics of the physical environment. But from the point of view of environmental probability, the environment is only able to provide the background and the probability of a certain behavior or perceptual event and is not able to determine the behavior definitively, and therefore man is free to choose the environmental conditions. This theory considers the quality of the environment in urban design as a concept, through the presentation of tangible features of the physical environment on the one hand and their perception, recognition, and evaluation by the observer on the other hand. Is. In this perception, it is the flow and the barrier between physical and tangible

features of the environment on the one hand and cultural patterns and codes and the mental abilities of the observer on the other hand that shape the quality of the environment. In general, the quality of urban design can be considered as three forces (components) of functional quality, experimental-aesthetic quality and environmental quality of cities. The functional component of the quality of urban design, on the one hand, includes the provision of easy and appropriate movement and access for pedestrians and riders to the city's attractive centers, and on the other hand, it includes other functions such as passive entertainment, people watching, and various events. To guarantee the vitality and richness of the spatial experience of the city. The experimental-aesthetic component deals with the perceptual, cognitive and environmental preferences of people towards urban spaces, and finally, the environmental component in its micro dimension includes categories such as the regulation of the microclimate of urban spaces, and in the macro dimension, it concerns the sustainability of life. It has an urban environment. In cities, there are various types of landscapes. Due to their diversity and attractiveness, they become urban landscapes. A landscape may be blocked, framed, extended, interrupted by tall buildings, extended, interrupted by tall buildings, or be given direction (Balling et al., 2010). William Holfred considers the landscape to be the result of natural unevenness and various land forms such as open spaces, parks, tree plantations, buildings and structures, and introduces the types of views and perspectives as follows: 1- Viewpoints from the suburbs The surrounding people look at the city. 2- Viewpoints inside the city that overlook the surrounding suburbs. 3- Views of the city from man-made or natural high points within the city limits. 4- Landscapes within the city that are limited to a street or a square or a special section. Perspectives mainly consist of any type.

## **MATERIALS AND METHODS**

In the urban landscape paradigm, the urban landscape needs a kind of medium-scale architecture, but this area is the next priority of planning, which explains the structure of the urban environment in the form of ecology. These

principles and their application in landscape architecture require a broader view from the micro to the middle and even the macro scale and pay attention to the main roots. In fact, the gap between landscape architecture as well as urban planning and design has specific solutions, which mainly originate from the process of qualitative design creativity and a little rationality. This problem, called the rejection and lack of connection between landscape architecture and planning and urban design, at its peak, has caused the discontinuity of the flow of urban life from the micro to the macro scale, which mainly manipulates the quality-of-life index. For this reason, the integration of the natural framework of the city and its green areas is faced with the problem of reducing the quality of everyday environments and is mostly limited to specific spots that are carried out by the relevant organizations to carry out local projects. The science of urban planning, in the form of shaping the overall structure of the city, is practically the first starting point of this importance and ultimately leads to the foundation of the practice of landscape architects. Therefore, according to the application and scope of practice of landscape architecture, there are three views on the subject of urban landscape. There is: considering the urban landscape as an attribute that is intrinsic to the physical environment of the city and exists independently of humans as an observer and evidence. Considering the urban landscape as a completely subjective and taste category that is made by the observer and has nothing to do with the structure and characteristics of the physical environment. Considering the urban landscape as a pattern or pattern that is formed by the cultural symbols and mental abilities of the observer. The approach of design-oriented planning, from an ecological point of view, is more focused on creating a bridge between two macro and medium scales, which often brings the connection of the architecture discipline in the middle scale. In this view, if the environment has the ability to increase the quality of life, a design approach is entered in the last step of this process, and planning as a formative platform can make the environment suitable for creating design. In other words, the planning approach in landscape architecture,



on an ecological scale, requires the creation of a linear process to optimize the substrate and the landscape creation process. For example, a park or a green roof (on a small scale) or spaces such as residential complexes (on a larger scale) are among the pre-planned patterns (based on design-oriented planning) and architects can choose the type of idea and structure of their design. According to the macro principles of the environment. In this approach, the design of a spot, which is done on an architectural scale, follows the planning of the ecological landscape and is part of the whole.

#### *Methodology*

The current research is analytical-descriptive research in terms of its structure, which in terms of its main goal is considered to be of the type of applied and developmental research, which can also be used as an exploratory research approach considering the lack of previous research on the concept of landscape in the field of the city in a methodical way. According to the course of theoretical foundations, the effective factors in the influence of the urban landscape in the field of ecology are considered and by explaining the branch of landscape architecture to it, these factors are tested by experts and elites for indexing using the Delphi method. Are taken so that the framework of the proposed criteria can be presented in chapter one. Based on this, a group of components has the ability to generalize in the direction of conducting research, which includes the assumption of a pair of criteria including ecological and functional values, urban and natural elements, and aesthetic and functional perceptions.

### **DISCOSION AND FINDING**

#### *Delphi method*

The most important task in the Delphi method is the selection of experts and experts in the desired field. In this way, the selected people are given information about the Delphi method and they are invited to participate in this research. Anonymity is one of the important components of this research approach, the questions from the selected specialists and experts are followed by successive questionnaires. In this research, the initial model is developed based on the theoretical

foundations and the use of existing models around the concepts of the urban landscape and the structural factors of the green roof. After the initial design, this model was tested and developed through the Delphi method. The use of open-ended questions in the Delphi questionnaire and their analysis in the next stages was a judgment about reaching a consensus among experts and reaching theoretical saturation of the qualitative methods used in the analysis of the data obtained in the present research. The collection of field data in the current research began with the collection of questionnaires in the first stage of the research and the extracted data were analyzed through descriptive statistics and qualitative analysis.

#### *Delphi method findings*

In this research, the dimensions of the urban landscape and the components of the green roof were used as a default in the first stage, extracted from the theoretical foundations of the subject, and then the dimensions of the landscape and the components of the ecological urban landscape are presented according to the hypothesis of the research. These sub-components are expressed based on the estimation of the knowledge dimension of experts and also the perceptual process of citizenship. These factors are set as a package of suggestions in the panel of experts and elites so that the Delphi method can be planned and applied. A total of 20 factors that were tested with this method to reach the final indicators include: visual scale factor, visual clarity, biological comfort, spatial quality, activity, stimuli, readability, proportions, formal characteristics, biological adjustment, quality of life. , vegetation, resilience, identity, sense of place, mental health, dynamic ecosystem, biodiversity and microclimate.

#### *Findings of implementing the Delphi method*

In this round, the panel members identified 14 factors out of 20 factors that were extracted from successful researches as having a medium, high and very high impact on developing an ecological urban landscape framework based on the concept of urban landscape architecture. The detailed and extended results related to the implementation of the first stage of questionnaire distribution are given in the following table. The factors of identity, texture and materials, activity, stimulus,

decorations, resilience, vegetation have been removed from the Delphi process due to their average importance of less than 2.5. (Tab. 1)

Table 1: phase one of the fuzzy method in compiling the final indicators of Urban landscape architecture in approach to ecology

No	Factors	Number of responses	Average	Standard deviation	Min	Max
1	Sense of Place	15	3/88	0/42	1	5
2	Environmental comfort	15	3/51	0/66	1	5
3	Mental health	15	3/32	0/61	1	5
4	Legibility	15	4/12	0/48	1	5
5	Proportions	15	3/95	0/35	1	5
6	Visual influence	15	3/88	0/45	1	5
7	Size	15	3/23	0/43	1	5
8	Aesthetics	15	3/67	0/52	1	5
9	Biological comfort	15	3/87	0/62	1	5
10	Dynamic ecosystem	15	3/77	0/42	1	5
11	Greenness	15	4/42	0/61	1	5
12	Visual scale	15	4/35	0/35	1	5
13	Visual clarity	15	3/44	0/44	1	5
14	Form feature	15	4/19	0/42	1	5

After the implementation of the first stage of assessment and evaluation of the opinion of the experts of the panel regarding the factors proposed and extracted from the theoretical bases and also receiving the suggestions of the panel members, in this round, in order to observe caution, all the factors extracted from the theoretical bases are again Along with the average opinion of the members in the first round and the previous opinion of the same member, it was provided to all the experts of the panel. The panel members recognized 10 factors out of the 14 factors presented in the second round

as having a high and very high impact (with an average greater than 2.5) on the research framework. The detailed and extended results related to the implementation of the second stage of questionnaire distribution are given in the table below. Kendall's coordination coefficient for the members' answers about the order of the 10 factors that had a high and very high influence in this round was 0.775. The factors of mental health, biological comfort, aesthetics and dynamic ecosystem have been removed from the Delphi process due to their average importance of less than 3.5 (Tab. 2).

Table 2: Phase two of the fuzzy method in compiling the final indicators of Urban landscape architecture in approach to ecology

No	Factors	Number of responses	Average	Standard deviation	Min	Max
1	Sense of Place	15	3/88	0/42	1	5
2	Environmental comfort	15	3/71	0/56	2	5
3	Legibility	15	4/32	0/58	3	5
4	Proportions	15	3/98	0/35	2	5
5	Visual influence	15	3/88	0/51	2	5
6	Size	15	3/86	0/53	2	5
7	Greenness	15	4/52	0/41	3	5
8	Visual scale	15	4/45	0/34	3	5
9	Visual clarity	15	3/54	0/54	2	5
10	Form feature	15	4/49	0/32	3	5

In the third round of compiling the research framework, the final indicators, along with the average opinion of the members in the second round and the previous opinion of the same member, were provided to all panel experts. The detailed and extended results related to the

implementation of the third stage of questionnaire distribution are given in the table below. Kendall's correlation coefficient for the members' answers about the order of the 10 factors was obtained as 0.793 (Tab. 3).

Table 3: Phase three of the fuzzy method in compiling the final indicators of Urban landscape architecture in approach to ecology

No	Factors	Number of responses	Average	Standard deviation	Min	Max
1	Sense of Place	15	4/18	0/32	3	5
2	Environmental comfort	15	4/51	0/26	3	5
3	Legibility	15	4/72	0/24	3	5
4	Proportions	15	4/28	0/36	3	5
5	Visual influence	15	4/38	0/35	3	5
6	Size	15	4/16	0/40	3	5
7	Greenness	15	4/82	0/41	3	5
8	Visual scale	15	4/95	0/35	3	5
9	Visual clarity	15	4/24	0/35	3	5
10	Form feature	15	4/69	0/22	3	5

The results of the three rounds of implementing the Delphi method in the research show that a consensus has been reached among the panel members for the following reasons and the repetition of the rounds can be ended:

1- In the second round, more than 50% of the members chose 14 influential factors in developing the urban landscape of Ecology based on the concept of urban landscape architecture, who had an average greater than 2.5 among their factors.

2- The standard deviation of the members' answers about the importance of the factors in the third round has changed significantly compared to the previous rounds.

3- Kendall's coordination coefficient for members' answers about the order of factors in the third round is 0.793. Considering that the number of panel members was more than 10 people, this amount of Kendall's coefficient is considered quite significant.

4- Kendall's coefficient of coordination for the arrangement of 10 influential factors in developing a research framework in the third round compared to the second round only increased by 0.017, which indicates a significant growth in this coefficient or the degree of consensus among the panel members in two consecutive rounds. Does not show

5- The points given to the factors by the experts and elites indicate that the indicators of readability, greenness, visual scale and formal features are the high points and therefore the most effective in realizing the construction and working model extraction.

## RESULT AND CONCLUSION

Based on this, the following research framework can be presented as the result of studies, theoretical framework and Delphi method (Tab. 4):



Table 4: Research framework of the urban landscape architecture with an ecological approach

The dimensions, components and indicators in explaining the structure and work of urban landscape architecture with an ecological approach						
Added concept	Component	Indicator	Indicator type	Measurement method	Practical scale	Minimum spatial scale of measurement
Urban landscape architecture, ecology	Visual-perceptual	Visual scale	Quantitative	Visual preference	Macro-Middle	Urban district
		Visual clarity	Quantitative			
		Visual influence	Quantitative			
		Form feature	Quantitative			
	Environmental	Greenness	Qualitative	Questionnaire	Middle	Urban area
		Functional	Quantitative			
	Aesthetics	Legibility	Qualitative	Questionnaire	Middle-Micro	Urban area
		Size	Qualitative			
		Proportions	Qualitative			
	Ecology	Environmental comfort	Qualitative	H.S.E Questionnaire	Micro	Urban patch
Socio-economic	Sense of Place	Qualitative	Questionnaire	Micro	Urban patch	

Therefore, it is possible to present a proposed model based on the framework of the proposed indicators that was concluded with the Delphi method, which explains the mechanism between the components as well as the final indicators. (Fig. 2)

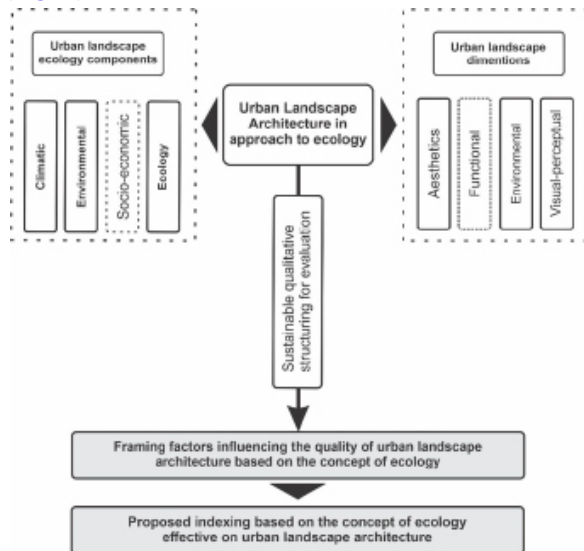


Fig 1: Research proposed conceptual model

## REFERENCES

- Akbari H, Pomerantz M. And Taha H (2001) Cool surfaces and shade trees to reduce energy use and improve air quality in an urban area, *Solar Energy*, 70 310- 295: (2001)
- Arnberger, A., Budruk, M., Schneider, I., and Stanis, S. (2022). Predicting place attachment among walkers in the urban context: The role of dogs, motivations, satisfaction, past experience and setting development. *Urban For. Urban Green.* 70,127531. Doi: [10.1016/j.ufug.2022.127531](https://doi.org/10.1016/j.ufug.2022.127531)
- Balling Wu, Haoa, b, Ye, Bozell.(2010), Assessing the Effects of Land Use Spatial Structure on Urban-Heat Islands Using HJ-1B Remote Sensing Imagery, *International Journal of Applied Earth Observation and Geoinformation*, Vol.26, Issue 3, pp. 175-170.
- Berndtsson JC et al. (2009). Runoff water quality from intensive and extensive vegetated roofs. *Ecological Eng.* 35(3):369-380
- Budruk, M., Thomas, H., and Tyrrell, T. (2009). Urban green spaces: A study of place attachment and environmental attitudes in India. *Soc. Nat. Resour.* 22, 824-839. Doi:[10.1080/08941920802628515](https://doi.org/10.1080/08941920802628515)
- Calheiros, C. S. C., Castiglione, B., and Palha, P. (2022). "Nature-based solutions for socially and environmentally responsible new cities: The contribution of green roofs," in *Circular Economy and sustainability* (Amsterdam: Elsevier).
- Dasgupta, R., Basu, M., Hashimoto, S., Estoque, R. C., Kumar, P., Johnson, B. A., et al. (2022). Residents' place

- attachment to urban green spaces in the Greater Tokyo region: An empirical assessment of dimensionality and influencing sociodemographic factors. *Urban For. Urban Green.* 67, 127438. Doi: [10.1016/j.ufug.2021.127438](https://doi.org/10.1016/j.ufug.2021.127438)
- Galli, J. A., Jimenez-Munoz, J. C., El-Kharraz, J., Gomez, M., Romaguera, M., Soria, G. (1998), Single- Channel and Two-channel Methods for Land Surface Temperature Retrieval from DAIS Data and Its Application to the Barrax site. *Int. J. Remote Sensing*, 1998, Vol. 25, Issue 1, pp. 215–230.
- Gray, T. (2017). “Retrofitting biophilic design elements into office site sheds: Does’ going green ‘enhance the well-being and productivity of workers,” in *Landscape Architecture: The sense of places, models applications* (London, UK.: Intech Open), 105–126.
- Kajosaari, A., and Pasanen, T. P. (2021). Restorative benefits of everyday green exercise: A spatial approach. *Landsc. Urban Plan.* 206, 103978. Doi: [10.1016/j.landurbplan.2020.103978](https://doi.org/10.1016/j.landurbplan.2020.103978)
- Lo, A. Y., Byrne, J. A., and Jim, C. Y. (2017). How climate change perception is reshaping attitudes towards the functional benefits of urban trees and green space: Lessons from Hong Kong. *Urban For. Urban Green.* 23, 74–83. Doi: [10.1016/j.ufug.2017.03.007](https://doi.org/10.1016/j.ufug.2017.03.007)
- Manso, M., Teotónio, I., Silva, C. M., and Cruz, C. O. (2021). Green roof and green wall benefits and costs: A review of the quantitative evidence. *Renew. Sustain. Energy Rev.* 135, 110111. Doi: [10.1016/j.rser.2020.110111](https://doi.org/10.1016/j.rser.2020.110111)
- Orr, F., and Wilkinson, S. (2017). “A little sanctuary’: An evaluation of the impact for participants of a rooftop horticultural therapy program in inner Sydney,” in *The Mental Health Services (MHS) 27th Annual Conference*, Sydney, Australia, Aug 29–Sep 01, 2017.
- Streutker, D. R. (2002), *Satellite-measured Growth of the Urban Heat Island of Houston, Texas, Remote Sensing of Environment*, Vol, 85, pp, 282–289
- Thomas, E. F., Mcgarty, C., and Mavor, K. (2016). Group interaction as the crucible of social identity formation: A glimpse at the foundations of social identities for collective action. *Group process. Intergr. Relat.* 19, 137–151. Doi: [10.1177/1368430215612217](https://doi.org/10.1177/1368430215612217)
- Williams, K. J., Lee, K. E., Sargent, L., Johnson, K. A., Rayner, J., Farrell, C., et al. (2019). Appraising the psychological benefits of green roofs for city residents and workers. *Urban For. Urban Green.* 44, 126399. Doi: [10.1016/j.ufug.2019.126399](https://doi.org/10.1016/j.ufug.2019.126399)
- Wilson, E. O. (1984). *Biophilia*. Cambridge: Harvard University Press.
- Wilson, E. O. (2017). *Biophilia and the conservation ethic*, In *Evolutionary perspectives on environmental problems* (England, UK: Routledge).
- Zhou, P., Grady, S. C., and Rosenberg, M. W. (2021). Creating therapeutic spaces for the public: Elderly exercisers as leaders in urban China. *Urban Geogr.* 1–24.

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