

Original Research Article

A Comparison and Evaluation of the Basics of Relationship Between Human and Nature in Two Bodies of Landscape and Ecology Knowledge

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Abstract | Sustainability is the knowledge that refers to the recovery of the relationship between man and nature and seeks to provide a set of concepts and methodologies to help humans and nature better interact. Ecological sustainability is a widely recognized branch of sustainability knowledge that draws upon the ecological interpretation of the components of the human and nature relationship to provide solutions for the enduring interaction of these two components. Thus, a review of the theoretical literature on ecology indicates that this interpretation is only based on the physical components of this relationship that does not provide a context for understanding their semantic aspects. This research aims to answer the question: "Which body of knowledge can produce the most effective man-nature relationship that is capable of making the two sides sustain it?" Thus, this article uses the pathology of the relationship between human and nature in ecological knowledge and establishes an analogy over the explanation of this relationship in landscape knowledge to examine the two attitudes using a descriptive-analytical method which is based on a critique of content and structure of the two attitudes. The findings suggest that ecological sustainability fails to describe all aspects of sustainability comprehensively and cannot provide solutions for the objective aspects of it, owing to its theoretical foundations. One would say that the relationship between man and nature is not only noted in biological aspects but also in yet another respect, which is affected by the perceptual process between these two components. On the other hand, landscape knowledge is an attitude that both explains the physical and semantic dimensions of the relationship between humans and nature. Thus, the conceptual sustainability model, if based on an interpretation of landscape from the relationship between humans and nature, can clearly explain the physical and semantic dimensions of sustainability and result in more complete measures.

Keywords | *Sustainability, Ecological sustainability, Ecology, Landscape ecology, The relationship between human and nature.*

Introduction | The relationship between humans and nature has always been one of the main challenges since the onset of humans' life on the earthly planet. Developments in recent centuries, including industrial civilizations and technological advancements, have destabilized this

equilibrium and caused irreparable damage to the human environment. Thus, to stabilize this relationship and make humans converge with nature, and also to mitigate the crises of the current age, scholars of various sciences have introduced numerous approaches, the most important of which may be the sustainability approaches. Sustainability is the knowledge that seeks methodologies and guidelines

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that will lead to the survival of the relationship between man and nature; in other words, sustainability is aimed at explaining an enduring interaction between man and nature. Because the concept of sustainability is based on the relationship between humans and nature, the interpretation of how this relationship is established will have a great impact on the conceptual model of sustainability. One of the most important interpretations of the relationship is the ecological knowledge-based interpretation that constitutes the foundation of one of the main branches of the sustainability subset, called ecological sustainability. For years, ecological sustainability has been recognized as one of the most effective sustainability bodies of knowledge; however, recent experiences have demonstrated the inefficacy of this body of knowledge to cover all the aspects of the relationship between humans and nature. Although ecological sustainability provides strategies for such major ecological concepts as the recovery of nature in modern cities, improving people's mental and physical health, and reducing energy consumption, there are barriers to using these approaches due to a failure to meet individual and social expectations and ignoring of cultural values. Thus, this article uses a pathology of the relationship between humans and nature in ecological knowledge to answer the research question: Which body of knowledge can produce the most effective man-nature relationship that is capable of making the two sides sustain it?

Initially, the research introduces and analyzes the theoretical basics of ecology as one of the most important interpretations of the relationship between man and nature, then proposes the landscape approach as a different interpretation of the said relationship to discuss and compare the two mentioned approaches. In sum, the research aims to develop a complete form of relationship between humans and nature that stabilizes the two sides of the relationship.

Research Methodology

The present article which is a descriptive-analytical study introduces a qualitative approach to address the objectives of the study and answer the questions. In the first step, it uses a library research method to gather data on landscape ecology, while, in the second step, it analyzes the collected data with an inference-reasoning method. In so doing, it reveals the relevant approaches to the relationship between man and nature.

Theoretical Foundations

• Relationship between human and nature; a challenge

Since old times, man has constantly sought to form a relationship with the surrounding environment as an interacting component. As environmental blessings ensure the survival of mankind, the presence of natural perils also threatens the environment. For this reason, if

the relationship between humans and nature, leads to the survival of mankind, has been a fundamental challenge to humans, as various scholars have interpreted this two-way relationship differently. Benson (2003) argues that human requires to follow nature. Similarly, Bernan considers humans to be a part of nature who need to interact with it to develop, as their identities are formed through this relationship (Bell, 2003, 119). However, the major issue is that the social system will not develop unless there are some changes in nature (Kroemker & Mosler, 2002: 94). Accordingly, one would categorize the reciprocal human-nature relationship into three time-conceptual periods; the first period was when man had no knowledge of nature and was absolutely governed by it. In fact, in this epoch, man was unable to fight against nature and was committed to it (Bollnow, 1980, 88). In the second era, there was a coexisting relationship between man and nature, with the former considering himself to be responsible for the latter in a balanced manner. In this epoch, man sought to rejoice in nature and acquired solace and composure, seeking to align nature to his benefit (Rappaport, 1987, 75). In the third era, as industrial civilizations developed, man had expectations beyond the attainment of security and pleasure. This era saw devastating human exploitation of nature, which derailed this previous relationship and destroyed nature as a whole (Yu, 2002). As a consequence of these eras, balancing the relationship between man and nature and ending the resulting crises in the present century has become the most critical challenge for scholars. In sum, one would suggest that the relationship between humans and nature has not, over these years, been a physical one, as it has taken on some semantic aspects also. For this, various approaches have been introduced to recover this relationship (Qalandarian, Taqwai & Kamiyar, 2015). The "sustainability" paradigm is one of the most notable proposed approaches to resolve this crisis that claims to meet modern needs without hurting future generations by providing solutions (Perman & McGillory, 2003, 108). In other words, sustainability can be regarded as a kind of interactive relationship between man and nature which ensures the continuity and survival of both man and nature (Hemmati, 2016, 83), (Fig. 1). In this connection, various interpretations of man and nature have been offered about the sustainability paradigm, the most notable of which is the ecological interpretation of sustainability that goes by the name "ecological sustainability." In contrast, there are also many other interpretations to explain this relationship, the most notable of which is the landscaping knowledge which differently describes this relationship. The basics of these two bodies of knowledge are later described, and the interaction between man and nature is explained.

• Ecology

Ecology is aimed at recognizing natural processes and establishing a link between humans and nature following

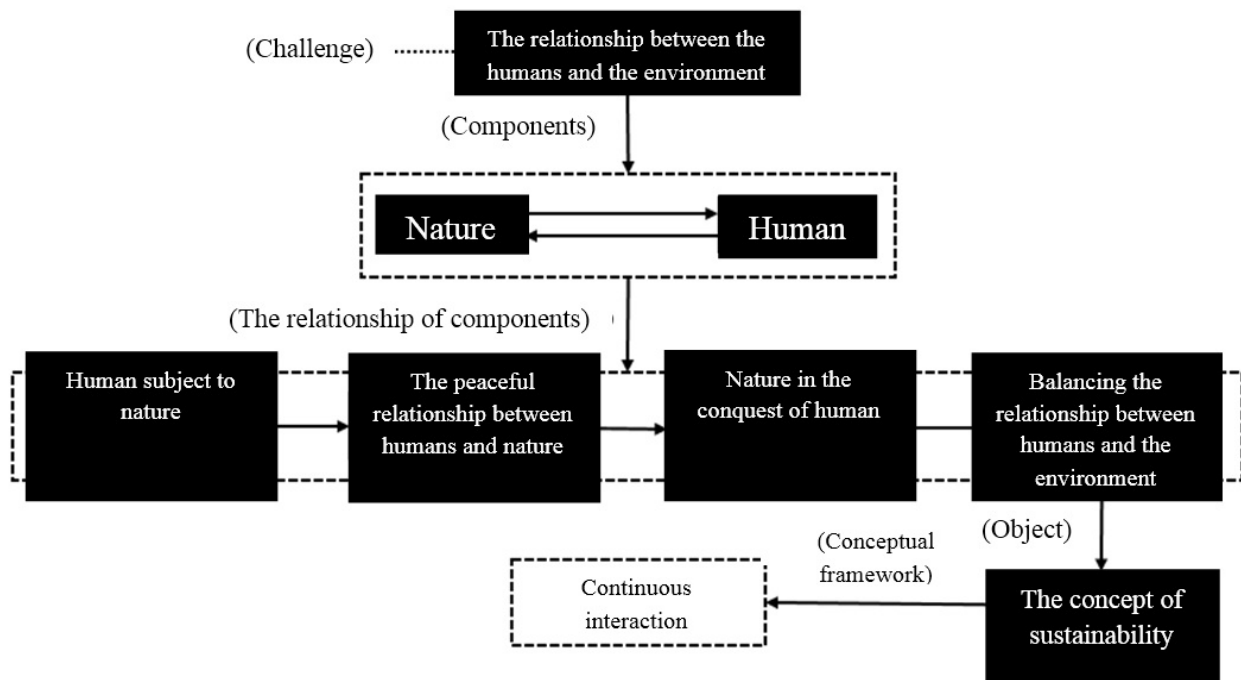


Fig. 1. Over time, the relationship between "human" and "environment" has undergone various changes. Today, with the aim of balancing this relationship, the concept of sustainability has been formed, which seeks methods that lead to a sustainable interaction between humans and the environment. Source: Authors.

peoples' distancing of nature and the devastation of natural resources. Ecology was established as a rigorous science in the second half of the twentieth century to provide data on the preservation of natural resources, which describe the natural processes and environmental degradation¹ (Makhzumi & Pungettin, 1999). Naveh and Liberman (1994, 21) posited: "as a modern body of knowledge, Ecology refers to the relationship between man and nature which uses general systems theories to address the physiology of living organisms and understanding of the ecosystem. Ford and Gordon also stated that the underlying subjects of ecology imply three basic concepts of "consistency," "coherence," and "biodiversity," which help establish sustainability (Forman & Gordon, 1981, 735). Wiens defines ecology to be a science that concerns the structure and dynamism of spatial mosaics as well as ecological consequences", arguing that it has every level of hierarchy and is analyzed at every large scale" (Wiens, Stenseth, Van Horne & Ims, 1993, 369). Similarly, Turner (1997) maintains that ecology at a large spatial scale emphasizes the spatial model of ecosystems, serving as a set of ecosystems with lifeless parts and biological components. Market (2004) posited that: "environmental ecology studies the relationship between living microorganisms and the environment." Ottoman (2014) stated: "Ecology is generally the study of interactions between organisms and the environment, with the latter consisting of physical properties that involve non-living and living agents." Wu suggested: "This body of knowledge studies the spatial composition of the earth consisting of biophysical and social factors,

and concerns the effects of organisms, matter, energy, and information" (Wu, 2019,180). Bemanian and Ahmadi (2014) defined ecology to be the underlying context to understand natural processes and manage natural resources aimed at achieving sustainable development. Hajghani and Ahmadi (2015) stated: "This body of knowledge, while aiming to achieve sustainable development, provides a sustainably scientific framework to understand natural processes and manage natural resources:" Dabiri & Masnavi (2016) concluded that "ecology studies the relationship between natural phenomena and their surrounding environment." The defining characteristic of ecology is the position it considers for the human being in the relationship between man and nature, where man is seen as a biological part of other living and sometimes non-living organisms. For example, Leopold stresses the preservation and integrity of the environment, considering man to be parallel with soil, water, plants, organisms, and natural elements (Leopold, 2005). Loreau et al. (2001, 807) also remarked, "Man in this perspective is influential on the ecological functioning like other animals and other biological elements." This has made the social element be excluded from definitions of ecology, as only the bio-social aspect is sometimes mentioned. In this connection, some researchers maintain that an assessment of ecological services focuses on biophysical aspects, and a few numbers of which have regard for social processes (Boyd & Banzhaf, 2007; Fisher & Turner, 2008, Cowling et al, 2008). Jafari concluded: "Many of the ecologists can be regarded as biologists who have embarked on ecological design and

planning” (Jafari Kalarijani, 2014, 7). Generally, ecology refers to the objective environment processes that study the relationship between the living and non-living organisms, as Mansouri holds that “Ecology refers to the outside world that identifies the phenomena and their interrelationship to describe the components of life, suggesting that it is confined within the material world” (Mansouri, 2015, 97), (Fig. 2).

• **Landscape**

The concept of place as a subjective-objective phenomenon with inseparable components transformed the bio-polar Cartesian world². In a century when contemporary cities were influenced by positivist partisan attitudes as well as deep social and environmental crises, the concept of landscape, a type of place, drew the attention of scholars as a holistic philosophy. In the meantime, Palermo (2008) considered the origin of landscape to be the cities facing biological crises and the lack of quality of life in the urban context. Landscape, initially studied following the Renaissance era and then in the 18th century as a concept to describe the natural environment and external characteristics (Berque, 1995), disrupted, in the twentieth century, the exclusive categorization of the phenomena into objective and subjective elements with skepticism in the Cartesian structure; however, it provided new dimensions of space interpretation (Mansouri, 2010, 30). One would note that landscape lies on the bio-polar shoulders of subjectivity and objectivity, which has an individualistic view of nature and considers the environment a mental-subjective phenomenon in relation to the object and subject (Alehashemi & Mansouri, 2017). In fact, the landscape can be regarded as a human’s relationship with a perceiving creature who perceives the environment as a perceivable space. Spirn (1998) considers this attitude a perception interaction between man and the environment. Bell similarly considers landscape an environment-related process that comes

from man’s experience of residence in it. In this process, he suggests, the environment serves as a physical space and perception as a non-physical space (Bell, 2012). Mahan and Mansouri (2017, 19) also remarked that landscape could be defined as an approach based on an indistinguishable human mind and environment interaction, which is influenced by the contrast of subjectivity and objectivity, instead of being a delimited bipolar attitude. Appleton (1980) also defines landscape as an environment perceived by man. Also, Swafied stresses the perceptual process between man and the environment, stating: “Landscape not only indicates a visibly concrete phenomenon but also refers to a subjective perception embodied in mind” (Swafied, 2016, 168). Farina held that landscape is a system of “conceptual” and “physical” components (Farina & Belgerano, 2004, 108). Lassus believed in the subjective and objective characteristics of the landscape and its inseparable nature (Lassus, 2013, 32). Similarly, Luginbuhl (2013, 40) defined landscape as a multidimensional concept that suggests the consistency of subjectivity and objectivity (Luginbuhl, 2013, 40). According to landscape knowledge, the key difference in the relationship between man and the environment is the embodiment of the perceptual aspect of this relationship along with its biological aspect, where man is not only a biological element of the environment but a perceiver of it. As a result, this body of knowledge regards the environment as a totality beyond physical subjects (Bahrami & Hemmati, 2020, 46), viewing the environment as a part of the perception process. In this vein, Zonneveld (1990) sees landscape to be an integration of environmental concepts with the concept of human perception. Similarly, Berque held that landscape is a subset of human places that come to life in relation to the living organism’s mind (Berque, 2013, 25). Mansouri suggested that landscape refers to a set of human perceptions in relation to the eternal realm in which the human mind is engaged. This causes the landscape nature not to be material in nature but to be considered a fundamental understanding of a reciprocating relationship between objectivity and subjectivity (Mansouri, 2010). Thus, as stated, the interpretation of landscape knowledge of the human-environment relationship is not only embodied in biological concepts and physical aspects but also in aspects beyond a perceptual relationship. In other words, speaking of landscape, man, as a biological element, is in a perceptual relationship with the environment, whose relationship is based on intertwined subjective-objective components (Fig. 3).

• **Landscape ecology**

Landscape ecology is a fledgling branch of ecology that developed following World War II and became a mainstream body of knowledge (Cook & Van Lier, 1994). Carl Troll, the German botanist and geographer, introduced the term “landscape ecology” and defined it as the study of

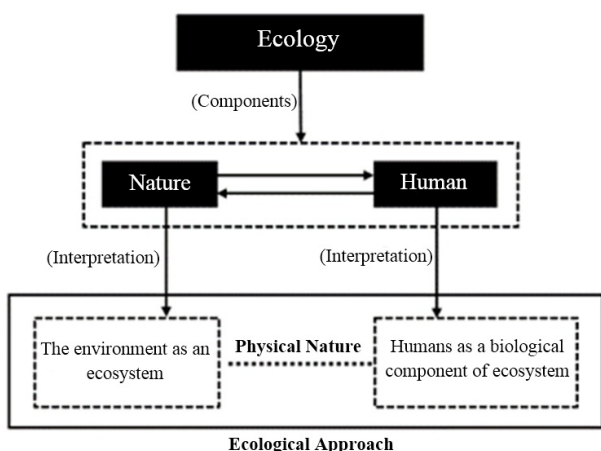


Fig. 2. An interpretation of the ecological knowledge of the relationship between man and nature reveals that man is regarded as a biological element of the ecosystem, and the environment as an ecosystem, and the relationship is physical in nature. Source: Authors.

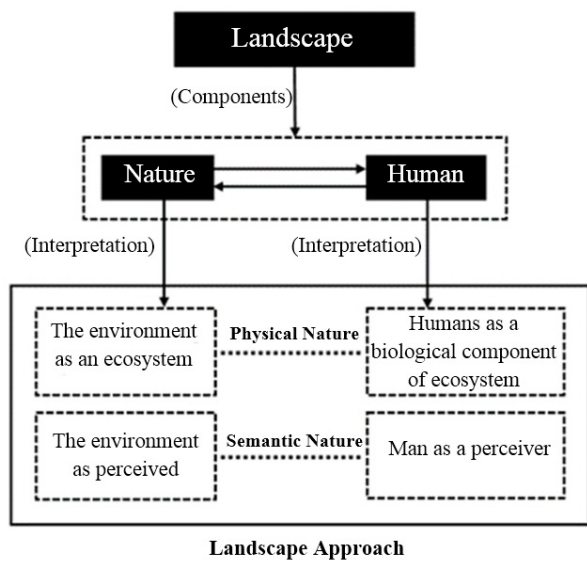


Fig. 3. An interpretation of landscape knowledge of the relationship between man and nature not only reveals that man serves as a biological element of the ecosystem and the environment as an ecosystem but also demonstrates man to be the producing process of perception, while the environment as the perceived. The relationship between man and the environment has both physical and semantic dimensions. Source: Authors.

complicated causal relations between life communities and their surroundings in a specific area of landscape (Troll, 1968, 1971). Landscape ecology is a recent approach to human interventions in nature to meet his needs, as it seeks to provide new definitions of the relationship between humans and nature and to present solutions to preserve and revive relevant natural resources (Hajghani & Ahmadi, 2015). As a modern spatial (horizontal) perspective, landscape ecology aims to familiarize geographers with the functional (vertical) perspective of ecologists (Naveh & Liberman, 1994). The holistic structure of landscape ecology recognizes the role of human factors and social, economic, and political processes as much as ecological processes in shaping the landscape (Makhzumi, 2015). In this connection, the landscape ecological design provides a layered and comprehensive perception of the landscape, which not only encompasses the concrete and visible but also the invisible and non-concrete (*ibid.*). Landscape ecology studies the structure (spatial relationship between separate ecosystems), functions, and development of the landscape (Forman & Gordon, 1981). Landscape ecology emphasizes the ecological effects of the spatial pattern of ecosystems (Turner, 1997). Landscape ecology refers to the study of relationships between spatial patterns and ecological trends at hierarchical levels of biological communities and different temporal and spatial scales (Wu & Hobbs, 2007).

Discussion

As mentioned above, as the pattern of the relationship between man and nature changed over the years and

the ecological balance was disrupted, the sustainability approach was established to achieve an enduring human interaction with the environment. This attitude seeks to provide patterns that help continue the relationship between man and nature. Ecological sustainability is, by now, recognized as one of the most important interpretations of the concept of sustainability both from a theoretical and a practical perspective. A literature review reveals that an ecological interpretation of the relationship between man and nature is an impression based on physical aspects that only focus on biological aspects, with semantic dimensions of the human-nature relationship not defined. However, different interpretations have stressed these aspects; for example, Naveh and Liberman (1994,180) consider it to be an interpretation of the “Physiology of living organisms and understanding of the ecosystem,” and Turner calls it to be “a spatial pattern of the ecosystem.” However, some definitions use the component “human” or “society” (Boyd & Banzhaf, 2007; Fisher & Turner, 2008; Cowling et al., 2008). According to these definitions, man and society are interpreted not as perceiving components that reproduce semantic dimensions but as biological organisms. Consistent with Loreau and Leopold’s definitions, man is interpreted as a biological being parallel with other components of the ecosystem such as soil, water, and plant (Loreau et al, 2001; Leopold, 2005). Thus, many ecologists can be regarded as biologists who developed ecological approaches. Thus, the solutions based on ecological sustainability were mainly without social-cultural facets, thus considered to be machine solutions for not meeting the social needs of the users (Gorji Mahlabani, 2010).

Willis (2000) argues that ecological sustainability only involves the bio-physical aspect, discarding cultural values³. Although attention to the biological aspects of ecology is imperative, one should note that ecological sustainability fails to comprehensively describe the sustainability characteristics and discards parts of reality only by focusing on the objective aspects of this relationship. All aspects related to the human and environment relationship should be taken into account to achieve a sustainable environment. A review of the literature shows that this body of knowledge concerns the human-environment relationship as a totality beyond physical subjects (Bahrami & Hemmati, 2020), yielding a perception out of this relationship that consists of physical and semantic dimensions (Lassus, 2013, 32; Berque, 2013, 25; Farina & Belgerano, 2004, 8; Luginbuhl, 2013, 40). In sum, because the concept of landscape provides a more comprehensive and accurate interpretation of the relationship between man and the environment, and the sustainability paradigm seeks an enduring interaction between the two, the development of a conceptual model based on the landscape definition of this relationship seems to be more effective (Table 1).

Table 1. A study of the dimensions of ecology and landscape knowledge from the perspective of theorists. Source: Authors.

	Profession	Yar	Theorist	Criteria	Approach
Ecology knowledge	Ecologist	1999	Makhzumi&Pungetti	Natural processes, erosion, and environmental degradation	Structural
	Ecologist	1994	Naveh & Liberman	Physiology of living organisms and knowledge of the ecosystem	Structural
	Geographer	1981	Forman & Gorden	Consistency, coherence, diversity	Structural
	Geographer	1993	Wiens et al.	Structure and dynamism of spatial mosaics	Structural
	Geographer	1997	Turner	Spatial pattern of ecosystems	Structural
	Geographer	2004	Market	Relationships between living organisms and the environment	Structural
	Geographer	2014	Ottoman	Interaction between organisms and the environment	Structural
	Geographer	2019	Wu	Impacts of organisms, materials, energy, and information	Structural
	Geographer	2014	Bemanian & Ahmadi	Natural resource management	Structural
	Geographer	2015	Haj Ghani & Ahmadi	Understanding natural processes and natural resource management	Structural
Landscape knowledge	Environment designer	2016	Dabiri & Masnavi	Study of the relationship between natural phenomena and the surrounding environment	Structural
	Environment designer	2005	Leopold	Emphasis on environmental protection and integrity	Structural
	Landscape architect	2015	Mansouri	Identification of the phenomena and the relationships between them and the living conditions	Structural
	Landscape architect	1998	Spirn	Perceptual interaction between humans and the environment	Semantic-structural
	Landscape architect	2012	Bell	Experience of human settlement in the environment	Semantic-structural
	Landscape architect	2017	Mahan & Mansouri	Interaction between the human mind and environment	Semantic-structural
	Landscape architect	1980	Appleton	Environment perceived by humans	Semantic-structural
	Landscape architect	2017	Swafeld	Perceptual process between human and environment	Semantic-structural
	Landscape architect	2004	Farina	A system of conceptual and physical components	Semantic-structural
	Landscape architect	2013	Lassus	Inseparable nature of the objective and subjective aspects of the landscape	Semantic-structural
	Landscape architect	2013	Luginbuhl	Multidimensional concept suggesting the objectivity-subjectivity link	Semantic-structural
	Landscape architect	2020	Bahrami & Hemmati	Perceptual aspect, together with the biological aspect	Semantic-structural
	Landscape architect	1990	Zonneveld	Integration of environmental concepts with the concept of human perception	Semantic-structural
	Landscape architect	2010	Mansouri	Observer's perception of the external outer domain	Semantic-structural

Conclusion

Ecological sustainability is a well-recognized conceptual framework that draws upon an interpretation of ecological knowledge of the human-environment relationship. A review of ecology literature shows that the concept (human-environment relationship) is only interpreted based on physical dimensions, with semantic dimensions already discarded. In other words, the approach to the human and environment relationship only stresses biophysical aspects and ignores perceptual aspects due to its theoretical foundations, with the human component considered to be a part of the ecological aspects rather than as a perceiver of space. Thus, one would suggest that this body of knowledge, as a partisan approach, can deal with parts of this relationship but fails to explain the semantic aspects of the relationship. Because this knowledge is not comprehensive enough to sustain the human-environment relationship,

one would need concepts beyond the physical attitudes of the ecology knowledge to achieve a general understanding of the said relationship. In contrast, the landscape is a modern concept that views the human and environment relationship and can explain the perceptual aspects of these two components, in addition to the physical and biological nature of this relationship. Landscape knowledge which stresses the inseparability of subjective and objective aspects provides a conceptual framework that yields a fuller understanding of man and nature. Thus, for an enduring interaction between man and nature, the development of a theoretical context of landscape sustainability can lead to more comprehensive measures by providing a complete definition of the dimensions of this relationship. In sum, landscape sustainability is the most effective way to gain sustainability in the relationship between man and the environment.

Endnote

1. Of course, the term ecology was first coined by the German biologist Ernst Haeckel in 1866. The word comes from Greek: οἶκος, "house" and -λογία, "study of" meaning and "logos" meaning knowledge (Kingsland, 1995). Following Haeckel, modern ecologists extended the concept. The leading ecologists of the nineteenth and twentieth centuries who have performed extensive research on urban planning and ecology were Howard and Geddes, Mumford, McHarg, Lewis and Leopold, and Forman and Gordon (Movahhed, Vali Noori, Hataminejad, Zanganeh & Kamanroodi Kajouri, 2016, 206).

2. Landscape was originally an approach, but it became an independent knowledge over time. Therefore, the terms landscape approach, as well as landscape knowledge, are key.

3. Ecology knowledge is used to achieve sustainability, develop strategies focused on ecological issues, and ignore cultural values while having disregard for the users' perception and needs; according to this body of knowledge, humans are seen as lifeless and living elements. In contrast, landscape knowledge focuses on human perceptual aspects and achieving sustainability to resolve the problems.

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