



A Landscape Design Process Based on Alexandrian Theory (An Iranian Academic Study)

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ABSTRACT: The author in this research has tried to link the Alexander pattern language theory, which is based on human oriented and spatial factors, to landscape design, which could come to a cyclic model of “A Pattern Language for Landscape Design” in Iranian schools of architecture. So, a landscape design process based on the value of Human-Oriented approach, which is extracted from other values, and the theoretical crisis in this area is discussed in this paper. The author has called this the “Socio-Cultural” approach. Many researchers such as Alexander (1977), Hillier & Hanson (1984), Norberg-Schulz (1984), Rapoport (1998) and Fathy (2000) have debated on the position and the value of human (Socio-Cultural approach) during design activity and thinking. The purpose of this research is to achieve an academic design process for “Landscape Design” in Iran, based on Pattern Language theory. In fact, achieving such a design model seemed impossible, if no relationship was found between the mentioned theory and Landscape Design. In the end, using a comparative study, some models were achieved. The research method is a survey implemented to collect data from 129 master students of landscape architecture, studying at various schools of architecture in Tehran. The sampling method was based on the stratified random sampling. A 49-itemed questionnaire was used to collect data, where the reliability of all subscales was more than 0.80, estimated from Cronbach alpha test. Hierarchical Confirmatory Factor Analysis was used to analyze data by the LISREL 8.72 software. Results of the analysis statistically confirmed the model of “A Pattern Language for Landscape Design”.

Key words: Pattern language, Landscape design, Academic design process, Socio-cultural dimension, Iran

INTRODUCTION

Although Iran has had great historical gardens and landscapes, yet today we can see only a few notable improvements in landscape design in Iran. This is while Western countries are known today for their great landscapes. According to Saunders (2002) and in confirmation of Alexander's thoughts, each place makes pattern languages in people minds based on their attitudes and ideologies. So the meaning of an open space, a seating place and even a park is different in different cultures. The second issue is related to our *educational systems*. There are very few or no landscape designers in most of

Iranian cities. This is a duty for our Ministry of Science, Research and Technology to develop such fields in Iran's universities. There are only three universities in Iran that have landscape architecture, which are only about 8-10 years old. With this extensive land and population, we can conclude that there is almost no expert in this profession. So, this research aims to face at least two important aims:

The first and literature-based goal is connecting two important areas with landscape design. A pattern language theory and a specific approach, the author calls Socio-culture, because of the existence of a unique “Genius loci”, and accordingly a unique pattern language in a place like Iran.

The second and the main goal is in the educational area. According to many sources the attention to culture, sense of place and human behavior in all landscape architecture projects is essential. So, the pattern

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language theory, which has these factors itself, can be an appropriate model for coaching landscape design projects and the place of initiation can be schools of architecture. Due to variety of cultures the results will be unlimited.

This research is not only a descriptive review of the very important issue of the socio-cultural dimension, but also it explores the explicit and implicit factors of Pattern Language. Considering that each place radiates a unique sense, or more specifically, owns a unique Pattern Language, the objective is to establish a new Pattern Language for contemporary landscape design in Iran. So, the main issues discussed in this paper are:

How is the communication between the socio-cultural dimension of landscape design and Pattern Language theory especially in Iranian contemporary landscape design? Could it be represented in a design model for this country?

How much attention do designers actually pay to the socio-cultural dimension in each of spatial patterns, or Pattern Languages, in Iranian contemporary landscape design?

So, the hypothesis of this research will be:

If the spatial features are important factors in landscape design, developing and using the pattern language based on socio-cultural dimensions can be achieved in the space-oriented and people-friendly landscape design process, as a practical mode in Iranian architecture schools.

The outcome of this paper will be useful to form future landscape design in this country, and may also be useful for researchers in other countries to be used in a comparative approach.

THE BACKGROUND/ LITERATURE REVIEW

“Think universally and act locally” is one of the main slogans of Sustainable Development, particularly for third world countries like Iran. The author believes that this slogan could be the basis of this paper in the area of landscape design. Iran, like other countries, can develop based on its capabilities, facilities and circumstances. Unfortunately, this event has never happened in architecture, because its role model has always been western countries, especially in the Qajar period (1785 - 1925). Nowadays, our Iranian designers are looking for their lost past and find it in a vernacular and contextual-based approach. The author, finds the Pattern Language as one solution to achieve a socio-culturally sustainable design thinking. So, using phenomenological approaches and according to pattern language theory, this study

argues that each place (or landscape) has its own spirit or character, relevant to its environment and context, which basically related to human activities and cultural issues.

Landscape design has various dimensions, which have already been analyzed by urban designers, landscape designers, or even architects and architectural theorists in different areas of design, each with their own specific perspective on design in various areas, like ecologic approach, economic approach, aesthetic approach, planning approach and other approaches, which could be known as values. Among the most important values, there is the relationship between humans and the landscape - what some experts have presented in various forms (Thompson, 1998; Swaffield, 2002; Midgley, 1995; Stephenson, 2008; Bell, 1999) and what the author calls the socio-cultural approach. The other dimensions, such as ecological aspects and aesthetics are less important from the point of view of this research.

Many documents indicate the importance of the socio-cultural dimension in landscape design. Tunnard believes that “Landscapes should be designed in accordance with human needs” (Tunnard, 1948, p. 78). Also Pye admits, in a modern and functional perspective that “landscape designers such as architects and engineers are responsible towards their clients and users to functional and safe landscapes” (Pye, 1978, p. 77). With a different outlook, the nature of landscape architecture as an anthropocentric design profession inherently supports the use of human experience and anecdotes over rigorous research (Rosenberg, 1986); (Thompson, 1998).

Under a different vision and based on Islamic thinkers such as Nasr (2007) who are more related to our social approaches, it can be understood that paying attention to nature and environment not only could help draw meanings and values out of them, but it could also help, especially young Iranian designers, get involved with the context in advancing their project.

The author’s study (based on data gathering) showed that most of the theorist in the landscape design field, focused on the socio-cultural dimension in this area.

PATTERN LANGUAGE

There are different and sometimes antithetical definitions of patterns. As Bell (1999) states, the patterns exist all around us. Having the power of pattern cognition, help us to get acquainted with our surrounding. We understand beauty through deciphering the relation between patterns and their meanings. Patterns are abstract concepts from fundamental environmental factors, which make environmental complexities understandable.



Alexander (1977) endeavored to present the lack of humanity in the calculated format of geometric design. So, he proposed pattern language theory, according to qualities without names, to develop design approaches contextually, based on human needs.

They state that Alexander has never described his work as phenomenological, yet others such as Seamon argued that his point of view and discoveries readily relate to a phenomenological perspective and method (Seamon, 2007). One value of phenomenological insights to the designer is that through them s/he may become more sensitive to human environmental experience and therefore create buildings and places more in tune with the essential nature of our humanness (Norberg-Schulz, 1984).

Alexander (1977) developed a thinking system in different scales of places, dealing with spatial form and layout. Permaculture thinking is an approach in the use of patterns especially through zoning prevalent by Mollison and Holmgren during 1970-1980 (Mollison & Holmgren, 1990). Indeed permaculture is an approach in agricultural activities and human spaces, which focus on the relationship found in models of natural ecologies. On the other hand, landscape architects such as Spirm believe in the use of these patterns in the design process (Spirm, 1998).

The author believes that to move to this approach give us an opportunity to think in a holistic way with a more subtle understanding. The requirements of such thinking are vernacular and organic methods, which lead to non-linear pattern language. As can be seen, pattern language thinking gives us rationale or tools for building a new context.

Alexander defines the architecture in this way: “*Architecture is just that stuff-material organization-which has unfolded*” (Alexander, 2001). Alexander expresses his thoughts about pattern language, in other words about “life” (2001-2005). As Alexander, Norberg-Schulz (1984) and also Bell state, these self organizing patterns remain better because of their harmony with present landscapes. Although Dee (2001) in her great book “*Form & Fabric in Landscape Architecture: A Visual Introduction*” points to environmental psychology and aesthetic approach in landscape design patterns, but what she emphasizes is to introduce physical patterns (decorations) in landscape design.

Pattern languages represents the interactions between Man and his environment, in an encoded manner. This language determines our inherent need for quality and spaces for different activities. This language is a set of tested and correct solutions that improve the quality of

the built environment beside human life and his feelings (Salingaros, 2007). Each pattern language reflects different methods of living, traditions and behaviors, which are proportionate with climate, geography, cultures and specific traditions. As Salingaros argues, living architecture has reliance to patterns while they shape spaces and buildings (Midgley, 1995).

According to Alexander (1977), Norberg-Schulz (2000), Salingaros (1999), Bell (1999) and even Dee (2001), it is obvious that all of the above mentioned writers discussed about the quality and layout of space and most of them called pattern as cultural forms based on historical and vernacular approaches.

Although Pattern language is the valuable facility of keeping general aims in mind, it can be concluded that in its ability to integrate philosophical and practical needs, pattern language offers a powerful conceptual tool for designing environments that both arise from and sustain a foundational culture, which is what this paper follows.

LANDSCAPE DESIGN PROCESS (ACADEMIC APPROACH)

In recent decades, there have been many attempts, both in Architecture and in Industrial Design, to improve design processes while quite few have been undertaken in Landscape Architecture. As mentioned before, the argument that design is a form of research has become popular in architecture and landscape architecture as a way to access research funding and grants, and to fulfill requirements for yearly contract reviews and promotions (Nassauer, 1985; Schön, 1988).

Of the most important and basic processes of design reported by architecture experts are analysis, synthesis and evaluation approaches (Jones, 1981). In our intended model the design process begins with analysis. Most of our academic architectural design processes start with a recognition step which, at the same time, covers the analysis step. There is a similar method to the cited approach in common landscape design called Survey, Analysis and Design (synthesis) or SAD (Turner, 2004). The result of such analysis indicates its effect in the synthesis design step, where collected input data is converted into specific output information.

Milburn and Brown (2003) discussed 5 different models of design (in relation with landscape design process) in order to attain an interactive research/design process. Their fifth model (The associationist model) is in relation with pattern language theory and the values the author has emphasized in this area.

Ledewitz identifies design as mysterious artistic



inspiration, whereby the design process is personal and unrelated to cognitive analysis (Ledewitz, 1985). Research information is internalized and informs the content of design without conscious consideration. Similar to Alexander and Norberg-Schulz’s way of thinking and unlike the structured heuristic or trial and error approach

described by Akin (1981), the artistic inspiration or associationist model approaches design problem-solving as free-form exploration or mental association. A form of daydreaming, the associationist approach encourages the individual to relinquish control of their thought process or direction, and allow thoughts to wonder.

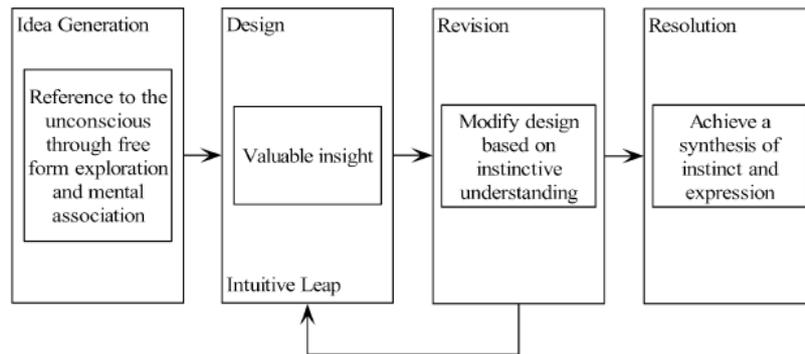


Fig. 1. Relationship between research and design as identified by the associationist model (Milburn & Brown, 2003).

According to Milburn & Brown (2003), the mentioned model is distinguished by its basis in the unconscious: free-form exploration and processes of mental association provide insights which form the basis of the design.

It seems that these phases can compare with Halprin RSVP cycle as well since his point of view is process-oriented rather than simply result-oriented. The idea of scores will make it possible to work in these regional communities as a method for energizing processes, people, and the natural environment in a constantly evolving and mutually involving procedure over time. Halprin states that: “I hope to see scores used as catalytic agents for creativity leading to a constructive use of change” (Swaffield, 2002).

ACHIEVING AN APPROACH IN LANDSCAPE DESIGN BASED ON PATTERN LANGUAGE THEORY

According to a survey in Iran which has been carried out by the author, the highest level of correlation in opinions can be sought in question 20 of the questionnaire. Most of participants answering the questions believed that the socio-cultural dimension is very important in devising high quality public spaces for people’s communication (no: 69 Alexandrian rule). At the first look, this judgment might seem very natural and simple, but the point that among 49 questions (which each has three dimensions in

landscape design) based on extended literature review, most of the people know this question is a confirmation on the necessity of paying attention to the socio-cultural dimensions in landscape design, as Jellicoe knows a people-friendly look on landscape a valuable perspective. The interesting point is that some other questions that possess a high correlation in opinions have also counted a high importance for the socio-cultural dimension of the question.

Maybe Jellicoe’s point of view emanates from Kant’s intellectual perspectives where he states that “our moral and fundamental duty is to look at people as goals not means”. Thompson also believes that a good landscape design is related to the people’s life under any political and economic conditions they live (Thompson, 2005).

At the stage of defining a link between Pattern Language and various dimensions of landscape design, performed through the meaning and perception of conceptual relations between these fields, the author was able to find this relation in another format (Relph, 1981). Thus, in another step, 49 rules out of the 253 rules, which Alexander had mentioned in his Pattern Language book, were extracted and studied.

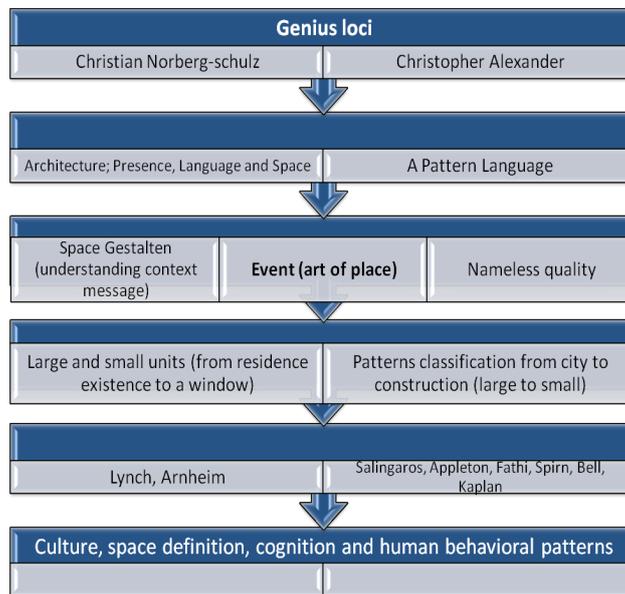


Fig. 2. The relationship between Alexander’s approach and others (by author).

However, these 49 rules were directly related to landscape design and each could be a subset of the three dimensions (socio-cultural, ecological, and aesthetic). These rules can be presented in five categories as the subset of the dimensions considering the existing physical patterns in landscape (water, green space, etc.) and the presence of human beings (man and landscape): urban landscape, landscape and environmental factors, Man and landscape, landscape and green space and finally landscape and elements.

The author follows the link that can be seen between the 49 features of Pattern Language (collected in 5 categories) and the dimensions of landscape design to confirm the hypothesis of “A Pattern Language for Landscape Design” in Iran focusing on pattern language aspects. It should be admitted that although some have mentioned the social and cultural dimensions in the Pattern Language area and in the macro area of architecture, no attention has been paid to landscape design to this point, especially in Iran. In other words, no researcher has attempted to extract the Pattern Language features related to landscape design.

On the other hand, Pattern Language theory, developed by Alexander and his colleagues in 1977, is derived from a spatial quality and is associated with human and his activities (Alexander, 1977).

Norberg-Schulz and Alexander believed that since each space has its specific identity, it possesses a general

and common name for which a description note should be added in order to distinguish it from similar ones (Norberg-Schulz, 2000 and Alexander, 1979). Approving the relationship between Pattern Language and the socio-cultural dimension of landscape design, it can be said that the evolution of thoughts began first and then architectural theories emanated from them, which is called “Pattern Language” theory according to Alexander and which is a clear point in developing this theory and presenting functional patterns in daily life spaces in Iran.

Confirming the relationship between the socio-cultural factors and landscape design in the relational model which was developed by LISREL software, it was noted that the strongest correlation between the hidden and seen variables was between the landscape design variable and the socio-cultural dimension with the correlation coefficient of 85%, while the weakest relation was also between the landscape design variable and the socio-cultural dimension with the coefficient of 27%. Besides, as mentioned before, according to the standardized solutions in the “landscape design pattern language relational model” in LISREL software, some (prioritized) questions have been presented: these questions, in the first stage, sought the prioritization of pattern language features in measuring the hidden socio-cultural variables which endorse the importance of the socio-cultural dimension and its effect on the pattern language.



The results of the hierarchic affirmative factor analysis and the results for the landscape design pattern language relational model variables, show the acceptance of this relational model offering appropriate and right quantities. All the numbers are acceptable and there are significant and meaningful relations between the three landscape design dimensions and all the pattern language features.

A brief looks at the deductive statistics and studying the relational models and the computer output of the research, suggests that examining the research hypothesis on the basis of “a landscape pattern language” model in LISREL shows that there is a significant relationship between all the landscape design dimensions and the pattern language features (in accordance with the following table). Moreover, there is also a significant and meaningful relationship between the area of landscape design and its ecological, socio-cultural and aesthetic dimensions.

The socio-cultural aspect of landscapes is deeply rooted in the history of places, traditions and culture. For example, we may mention the extension of social activities in landscapes -known as cultural landscape-, the effects of landscapes on people’s spirit, the gardens’ building - such as Kooshk in Iranian garden- as a place for people’s gathering, and finally, the landscapes themselves as public spaces.

The communication of contemporary landscape design process in Iranian society, the Pattern Language theory, and the necessity of paying attention to the socio-cultural aspect as a missing link, shows the novelty of a problem that has never been truly investigated in any research.

Then, one of the most important outcomes of this research will be the attention to human cultures and societies. By developing this approach, a unique applicable solution based on the real elements in creating identity patterns, such as society and climate changes, will be introduced to landscape designers in Iran. In this

process, the principles of landscape design should be extracted from Alexandrian rules like what Seamon has done in an experimental work to link the areas of pattern language and ecological approach in an urban design studio (Seamon, 1993).

The author believes that, according to Seamon experiment and similar to that, it is possible to have an experimental and comparative work in Iran to show the impacts of a socio-cultural approach on landscape designers (especially students) based on pattern language theory in the above-mentioned country. Seamon argues that in pattern language the underlying motivational force is a sense of environmental care and concern grounded in a positive emotional impulse, so, Pattern Language offers one practical means for translating feeling into action and environmental concern into environmental design (Seamon, 1993).

RESEARCH METHOD

The present paper has been done with the purpose of extracting socio-cultural, ecological and aesthetic dimensions from the pattern language features and considering the landscape design coordinates and achieving the pattern language for landscape designing in the form of a model.

This research was carried out with a quantitative research method and started with a survey. It was done on a group of 129 landscape architecture students and graduates of universities in Tehran, randomly selected from the Landscape Architecture Departments of three universities and also some Iranian experts living abroad. More than 200 questionnaires were electronically distributed among the participants, and 129 of them were returned. Therefore, in this research, the means of data collection was a questionnaire distributed and collected through the internet, which contained 49 questions based on the Likert scale with degrees from 1 to 5.



Table 1. A part of Pilot questionnaire format

	Extracted criteria from Alexandrian rules	Representation of criteria in the landscape field	Evaluation of criteria for different landscape values					
			Score	Very high	High	Average	Low	Very Low
Category 2: Urban Landscape	Design of pedestrian space		Socio-cultural:					
			Ecological:					
			Aesthetic:					
	Design of specific functional spaces in order to promote quality of environment		Socio-cultural:					
			Ecological:					
			Aesthetic:					
	Design of pedestrianized streets		Socio-cultural:					
			Ecological:					
			Aesthetic:					
	Appropriate use of in-filled spaces between buildings		Socio-cultural:					
			Ecological:					
			Aesthetic:					

Initially, the test results of Cronbach's alpha for 32 participants indicated desirable coefficient reliability. At the perspective of data collection design, the research method is correlation research (variance covariance matrix method) in which a hierarchical factor has been used for analysis. In order to study the validity of the test structure, a factor analysis was used. The research model (relationship model of "A Pattern Language for Landscape Design") was prepared in LISREL 8.72. In this method, the hypotheses on the latent and observed variables were examined and then presented and evaluated as a model of landscape design relationships including all (ecological, socio-cultural, aesthetical) dimensions, besides the aforementioned landscape design approaches

with different pattern languages (related to landscape architecture.)

The output of the hierarchic affirmative factor analysis of CFI, AGFI, and GFI for the current model showed a desirable level. Therefore, this model has a good quality and the ecological, socio-cultural, aesthetic factors of the pattern language specifications (in the landscape design) can be affirmed. All Lambda coefficients are statistically significant. This shows that almost all micro scales of the test can measure the above said factors components and all the relations are significant.

This result can also be achieved in statistics language, as the hierarchical factor analysis shows that the pattern language features effect on the following: socio-cultural



dimension ($\lambda = 0.85$), aesthetic dimension ($\lambda = 0.81$) and ecologic dimension ($\lambda = 0.68$).

In order to reach the analytical model of “A Pattern Language for Landscape Design” hierarchical factor analysis was applied. Before running hierarchical

confirmatory factor analysis normality, linearity and hemodestesity were checked. The final model of “A Pattern Language for Landscape Design” based on hierarchical confirmatory factor analysis was reached as shown in the following model:

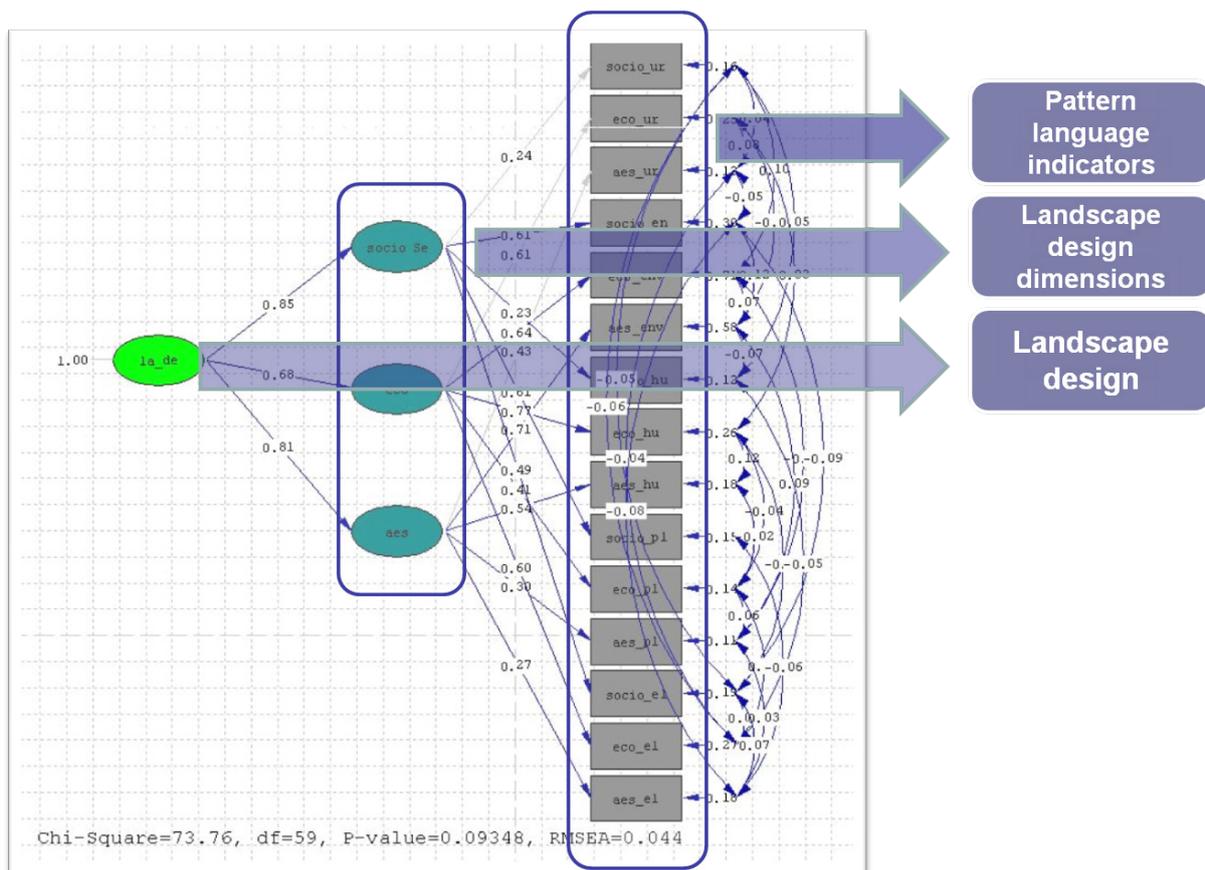


Fig. 3. The standard model of relationships between variables and model factors in hierarchical analysis

The above model is the standardized lambda coefficient for the final model was achieved after multistage model modifications. Standardized values show the effect of variation in each indicator for the one unit change in the component.

DISCUSSION & CONCLUSION

After arriving at a “pattern language for landscape design” model, the scientifically conclusions that can be expected from this model and accordingly applied in landscape design are as follows:

The landscape design pattern language cyclic

model suggests that in the cognition and analysis stage landscape designers can put all the collected data in three categories of landscape design value dimensions (socio-cultural, ecological and aesthetic) and the number of these categories might increase according to the approaches (for example, the political dimension might be analysed in a project). Since this research works on people-friendly and physical factors of the landscape, it limits itself to these three factors. However, designers can do the total categorization at the first step and then start the data collection in accordance with their categories. The result of this step would be obtaining the total data which can support landscape design procedures to the end.



Subsequently, according to the achieved relational model, the designer should try to list all the physical features he wants to have in his landscape design as Alexander does. This list starts with the events that happen in the whole site and can reach to a gate, a secondary way, a paving, and even to the selection of plants. In order to achieve these features, the designer should think of the total spirit of the design and each component in detail. For instance, what are the features of the entrance? And what are the relations between them and the three dimensions of the landscape design to be taken into consideration? These visual information can be the raw material for the landscape design and support the whole and details of the design.

Another important conclusion of this research is analysing the effects of the above mentioned communicative model on the academic design process as a reference to human base landscape design process with some relevant sets of dates. Here, in this paper and according to Alexandrian rules, data related to human, social and cultural along with physical factors will be converted to desired output data. Very often in the initial phases of design process, these sort of information, both in architecture or landscape design, are being represented in forms of visual sketches or diagrams and later in the process, in forms of plans, sections, elevations

or perspectives, highlighting the position of man in association with the final design.

What the communicative model of “A Pattern Language for Contemporary Landscape Design” proposes is that Iranian contemporary landscape designers can arrange all collective data in trivalent dimensions -socio-cultural, ecological and aesthetics- during the analysis step while the main emphasis is held on the socio-cultural aspect. These dimensions can be replaced according to different approaches of landscape design (economical, political etc).

Finally ,after this step and according to the communicative model ,the designer will have to arrange all the physical and human-base values of his landscape design project .The list may vary from general flows from the entire site to pavement design or planting selection .To achieve these values ,the designer should think about the spirit of landscape design both as a whole and in details, although s/he should join these valuables and the Socio-cultural dimension of landscape design .The values can be categorized) for example in physical categories such as water .(At the end ,the relation between each category with the socio-cultural dimension may be represented in form of sketches or diagrams .This visual information is the material for the final landscape design that supports the holistic to detailed design.

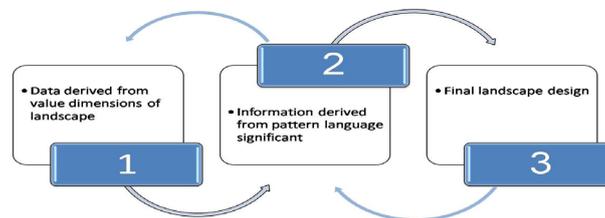


Fig. 4. Basic model of landscape design process

The author examined pattern language use in terms of the learning process and educational practice, and, more particularly, in introductory design where we find that ideas, which resonate with the pattern concept, predate the explicit use of patterns in designing pedagogy. This process has been examined by the author practically and in two universities of Tehran, with the results being presented in another paper. Although the merit of this model belongs to its inherent process and not to its visual quality, but the researcher believes that the outcomes of this process has reached noteworthy compositions.



REFERENCES

- Akin, O., (1981). Teaching architecture. In: Comerio, M.C., Chusid, J.M. (Eds.), Proceedings of the 69th Annual Meeting of the Association of Collegiate Schools of Architecture on Teaching Architecture. Association of Collegiate Schools of Architecture, Washington, DC, pp. 16–30.
- Alexander, C. (1979). *The Timeless Way of Building*. New York: Oxford University Press.
- Alexander, C. Ishikawa, S. Silverstein, M. Jacobson, M. Fiksdahl-King, I. and Angel, Sh. (1977). *A Pattern Language: Towns, Buildings, Construction*. Oxford University Press. New York.
- Alexander, C. (2001, 2002, 2004 & 2005). *The Nature of Order* (four volumes); Book 1, *The Phenomenon of Life* (2001); Book 2, *The Process of Creating Life* (2002); Book 3, *A Vision of a Living World* (2005); and Book 4, *The Luminous Ground* (2004). The volumes are published by the Center for Environmental Structure, Berkeley, California.
- Bell, S. (1999). *Landscape, pattern, perception and process*. Taylor & Francis; 1 edition.
- Dee, C. (2001). *Form and Fabric in Landscape Architecture*. First published by Spon Press. London and New York.
- Fathy, H. (2000). *Architecture for the Poor: An Experiment in Rural Egypt*. University Of Chicago Press.
- Halprin, Lawrence. (1970). *The RSVP Cycles: Creative Processes in the Human Environment*. George Braziller; 1st edition.
- Hillier, B., Hanson, J. (1984). *The social logic of space*. Cambridge: Cambridge University Press.
- Jones, C. (1981). *Design Methods: Seeds of Human Futures*. New York: John Wiley and Sons.
- Ledewitz, S. (1985). Models of design in studio teaching. *J. Architectural Educ.* 38 (2), 2–8.
- Midgley, M. (1995). 'Duties Concerning Islands', in R.Elliot, ed., *Environmental Ethics*, Oxford Readings in Philosophy, Oxford University Press, Oxford.
- Milburn, L.S., Brown, R.D. (2003). The relationship between research and design in landscape architecture. *Landscape and Urban Planning* 64. pp 47–66.
- Mollison, B. and Holmgren, D. (1990). *Permaculture One: A Perennial Agricultural System for Human Settlements*. Tagari Publications; 5th edition.
- Nasr, S. H. (2007). *Man and Nature: The Spiritual Crisis in Modern Man*. Kazi Publications; Rev Sub edition.
- Nassauer, J.I. (1985). Bringing science to landscape architecture. In: Stoltz, R. (Ed.), *Proceedings on the CELA Forum by Issues of Teaching and Instructional Development in Professional Education*. Council of Educators in Landscape Architecture, pp. 41–44.
- Norberg-Schulz, Ch. (1984). *Genius Loci: Towards a phenomenology of Architecture*. Published by Rizzoli.
- Norberg-Schulz, Ch. (2000). *Architecture: Presence, Language*. Place Skira. Milan.
- Pye, D. (1978). *The Nature and Aesthetics of Design*. The Herbert Press, London (first published as *The Nature of Design* in 1964 by Studio Vista, London).
- Rapoport, A. (1998). Using 'Culture' in Housing Design. *Housing and Society*. Vol. 25, No. 1/2, pp. 1–20.
- Relph, E. (1981). *Rational landscape and humanistic geography*. London. Groom Helm.
- Rosenberg, A.M., (1986). An emerging paradigm for landscape architecture. *Landscape Journal*. 5 (2), 75–82.
- Salingaros N.A. (2007). *A Theory of Architecture*. Publisher: ISI Distributed Titles.
- Salingaros, N.A. (1999). Architecture, pattern and mathematics. *Nexus network journal*. Vol: 1. pp: 75-85.
- Saunders, William S. (2002). *A Pattern Language by Christopher Alexander (Book Reviews)*. New York: Oxford University Press.
- Schön, D.A. (1988). Toward a marriage of artistry and applied science in the architectural design studio. *J. Architectural Educ.* 41 (4), 4–10.
- Seamon, D. (1993). *Dwelling, seeing and designing: toward a phenomenological ecology*. State university of New York press, Albany.
- Seamon, D. (2007). *Christopher Alexander and a Phenomenology of Wholeness*. Annual meeting of the Environmental Design Research Association (EDRA), Sacramento, CA, May 2007.
- Spirn, A. (1998). *The Language of Landscape*. Yale University Press, New Haven.
- Stephenson, J. (2008). The Cultural Values Model: An integrated approach to values in landscapes. *Landscape and Urban Planning*. Volume: 84. pp: 127-139.



Swaffield, S. (2002). *Theory in landscape architecture: A reader*. University of Pennsylvania press. Philadelphia.

Thompson, Ian H. (2005). *Ecology, Community and Delight: Sources of values in landscape architecture*. Published in the Taylor & Francis e-Library (second edition).

Thompson, I.H. (1998). Environmental ethics and the development of landscape architectural theory. *Landscape Res.* 23 (2), 175–194.

Tunnard, C. (1948). *Gardens in the Modern Landscape* (revised 2nd edition), Architectural Press, London, and Scribner, New York.

Turner, T. (2004). *The Design methods*. (Turner private website: www.gardenvisit.com). (visited: June, 2007)