

# **Vernacular Design As The Teaching Tool Of The Ecological Architecture**

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## **Summary**

We have a great accumulation of houses dating back from all different ages in Anatolia. Since the early samples of the houses and the settlements, environment is the key factor both for picking up the location and the shaping of the buildings. Anatolia had witnessed different migration moves from both directions due to its specific geographic location, and all the cultures that left their traces had created a big variety of houses, under different climatic conditions of Anatolia. As Hasan Fathy says “ The building dwells from the land it belongs.”

Our ancestors have survived, sheltering themselves in the traditional buildings which has been experimented through the ages. The people living in colder climates, have heated themselves burning wood or organic disposals. The people living on warm and humid climates have well utilized the air currents for minimizing the affects of humidity. The people living in the hot dry climates have faced other problems; the big temperature differences between day and night, and very low humidity. What they have in common is, they all have picked up the right forms, using the local building material, they have overcome the negative impacts of the climatic conditions. In vernacular architecture, not only the climatic problems were solved, but also the aesthetics, physical and social functionality were considered. For generations, they had provided comfortable life conditions and microclimates as a result of the great architectural experience.

Even there is a big technological achievement, it is stil quite not possible to have the same comfort quality in the modern settlements

as in the traditional ones. Life styles are not reflected to the built environment and building shells are formed regardless to the climatic conditions, and most of the contemporary buildings are not integrated with the nature and the environment. But the purpose of all the different disciplines contributing to the building industry is the comfort of the people.

In summary, the vernacular architectures in Anatolia, have design features coping up well with the natural environment. The houses tell us about their geographic location, winds, elevations, precipitation, natural environment, the profession of the owner, and the local culture. The evaluation criteria is totally overlapping with today's ecological design concept.

In this context, you can ask whether the building experience carried out through the generations can contribute as much as the scientific knowledge to solve the ecological problems.

On this paper, "Environmental Design" course, - that I teach in Mimar Sinan University, Faculty of Architecture, in which the vernacular architecture is evaluated in ecological point of view, is going to be introduced.

In our country, there are not many samples of ecological design. But on the other hand, the country is very rich in forms of vernacular architecture. In our lesson of "Environmental Design", studying those vernacular houses, in ecological context, is very efficient, as the students learn more depending on their own observations and evaluations. For the field study, the students are encouraged to choose the local architecture in their hometowns. It gives them some certain advantages. The students from the other countries, bring the samples from their own countries. Therefore, students have the opportunity of seeing a big variety of samples during the portfolio presentations.

On the paper, the course will be discussed as ecological design education model, and it will be supported by the students' papers.

**Key Words:** Ecology, Vernacular, Ecological Architecture, Vernacular Design, Environmental Design

## **1.Introduction**

Environment is the major input of the architectural design. Studying the traditional settlements, not only in Turkey but all over the world, environmental components; geography, climate, topography and socio-cultural facts have affected the building design. In different cultures, different climates, and different topographies there are much different architectural works. But the communities in different parts of the world, have solved their problems more or less in similar approaches.

But the present day buildings in our country can be called the similar type of uniform glass and concrete boxes, designed and built in every different town, landscape, and climate, neglecting the environmental facts, and the people belonging to the different cultures are pushed to live in. In this approach, where the environmental facts are totally neglected, long term problems are faced for the sake of short term solutions. We should rather design and built with environment, co-exist with the environment instead of designing and building neglecting the environment.

Mary Catherine Batesone, in her paper of “Understanding The Natural Systems” (1997) explains this idea as below:

“I believe that with the shift from an emphasis on physics and engineering providing our metaphors to a period when the biology is the area that’s really popping scientifically, we’re moving into an area where we will be learning to design with nature. But all human patterns of adaptation are designed not so much by individuals as by communities that refine and adapt their patterns over long periods of time. But now we do it faster... When we think about design, we tend to think about material things: machines, automobiles, houses, highway systems. But you can apply the concept of design social arrangements, social institutions, educational systems, economic systems. We’re going to have to design new patterns all of those levels, and they have to fit together. Our machines, our value systems, our educational systems will all have to be informed by this switch, from the machine age when we tried to design to schools to be like factories, to an ecological age, when we want to design schools, and families, and social institutions in terms of maintaining

the quality of life not just for our species, but for the whole planet” (Batesone, M., C., 1997)

## 2. “Environmental Design” Course

Environment Designers are in charge of keeping the balance in between the nature and the human needs. It would be the beneficiary to redefine the human nature relations, and solving problems in this context, rather than separating human beings from nature; this is for the well being of both the nature and humans. The architectural students should be gained this point of view, and the related information in the early years of their education in order to have them always searching for this human nature relationship, in the project studios of the advanced years.

<b><u>COURSE TITLES:</u></b>	
<b>1st Week:</b>	Designing the Natural and the Built Environment / Prof. Ali Musluba•
<b>2nd Week:</b>	House-Environment Interaction in Anatolia Through the Ages 1 / Assist. Prof. Dr. Selda Karaosman
<b>3rd Week:</b>	House-Environment Interaction in Anatolia Through the Ages 2 / Assist. Prof. Dr. Selda Karaosman
<b>4th Week:</b>	Environmental Influences on Shaping of the Houses around •znik Lake Village Settlements / Assist. Prof. Dr. Selda Karaosman
<b>5th Week:</b>	Environmental Conditions in the Eastern Black Sea Settlement Patterns / Prof. Esad Suher
<b>6th Week:</b>	Learning From the Local; Environmental Influences on Sustainable Settlements, Different Samples From the World / Assist. Prof. Dr. Selda Karaosman
<b>7th Week:</b>	Environment in Modern Vernacular; Hassan Fathy, Rasem Badran, Balkrishna Doshi / Assist. Prof. Dr. Selda Karaosman
<b>8th Week:</b>	Aesthetics in Nature; Natural Systems, and Shaping of Their Design / Assist. Prof. Dr. Selda Karaosman
<b>9th Week:</b>	Nature As the Environmental Design Model, and Making Nature Visible / Assist. Prof. Dr. Selda Karaosman
<b>10th Week</b>	Biological Design, and Principals / Assist. Prof. Dr. Selda Karaosman
<b>11th Week</b>	Biological Design Samples / Assist. Prof. Dr. Selda Karaosman
<b>12th Week</b>	Presentation of Seminary Works / Assist. Prof. Dr. Selda Karaosman
<b>13th Week</b>	Presentation of Seminary Works / Assist. Prof. Dr. Selda Karaosman
<b>14th Week</b>	Presentation of Seminary Works / Assist. Prof. Dr. Selda Karaosman

Table 1. Environmental Design Course, Syllabus

The “Environmental Design” is an elective course, in which we accept the students’ enrollments from different grades. (Table 1) The purpose of the course is to have the candidate architects introduced the “environment” concept in different ways, and to

teach them ecological architecture using vernacular architecture designs.

## 2.1. Environmental Input to the Shaping of Houses in Anatolia Throughout the Ages

In “Environmental Design” classes, we teach the architecture students, the early samples of wind breakers which were built to protect the people from the natural bad weather conditions. (Figure 1) The samples of the early settlements in Anatolia, Cayonu, Asikli, Catalhoyuk, Hacilar Bogazkoy, Troy and Demircihoyuk settlements, and ancient Hellenistic city of Priene, and Byzantine era Cappodocia settlements explained in the environmental context. (Figure2,3,4)

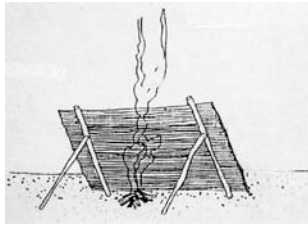


Figure 1. Wind Protection  
(Housing Settlement in Anatolia  
1996)



Figure 2. Malatya Balaban / Cayonu  
(Sozen M.,Erurun C.,Anatolian Vernacular Houses  
1996)



Figure 3. Aksaray / Asikli  
(Housing Settlement in Anatolia  
1996)



Figure 4. Cappodocia / Uchisar  
(Photograph by Selda K. Karaosman)

Throughout history, following the transformations of the life styles, and social structure, the type of shelters had been changed. The domesticated animals, the stored crops, increasing prosperity can be considered as the early major changes. The samples of traditional

houses, belonging to this period, which expires up to our age in the rural parts of the country are shown, explaining the houses' characteristics involve lots of design input about the region it is built, the dominant culture of the area, the life styles and the economic structure of the inhabitants, locally provided building material and the properties of the natural environment where it is located.

In Anatolia, people lived in different climatic conditions for thousands of years. Since they started building their shelters, they have coped up well with the natural environment, and overcome the negative conditions. Our country has a great advantage, as it has all different type of climatic zones, and each different zone is rich in traditional settlements. We have the samples from:

- Temperate climate: •znik Village Settlements
- Cold climate: Erzurum
- Hot-humid climate: Antalya,
- Hot-arid climate: Diyarbakır, Urfa-Harran

The similar building forms, and shapings from the rest of the world, where they have similar environmental and climatic conditions. For example, the similar conic domed structures of Syria and Urfa-Harran (Figure 5,6) or mud brick houses of New Mexico / Taos Pueblo and the mud brick houses which you would see almost all over Anatolian plateau. (Figure7,8)



Figure 5.Syria / Ebla  
Photograph by Z.Gürler



Figure 6. Urfa / Harran  
Photograph by Albert Gabriel



Figure 7. Taos Pueblo / New Mexico / Earth Buildings  
(Tumertekin E., Özgüç N., Beseri Coğrafya, •nsan, Kültür, Mekan, 1987)



Figure 8. Slopes of Agri Mountain Ararat, near Kars  
(Tumertekin E., Özgüç N., Beseri Coğrafya, •nsan, Kültür, Mekan, 1987)

Actually, this the biggest evidence of how important the nature is, in the shaping of buildings. (Picture 8,9) There would be different conditions within the same area; “in Iznik sample, within a small geographic area, we might talk about the different shapings of the traditional settlements of mountain villages, plain lands vilaage settlements, forest villages, and plateu villages.”(Karaosman S, 2004)

When ecologically evaluating the samples, the content of the course “Ecological Design Strategy and Methods, I – II” is reffered. Evaluation criteria is formed, after studying the valid assessment tools (BREAM, LEED, GBTool,...) commonly in use, and the analysis of the traditional settlements. (Table 2)

Some ecological design strategies explained supporting with vernacular architecture samples. The cisterns, used for collecting the rain falls, and very common in traditional settlements, and earth roofs with vegetation similar to the popular green roof approach of today. (Figure 9,10)



Figure 9. Cistern in Bodrum  
(<http://www.bodrubaglari.com/Yoremiz.html>)



Figure 10. Asikuzeyir Village, Kars  
(Atlas dergisi, Temmuz 2006, “Son Umudumuz: Ekokentler, ) s.34

<b>ASSESSMENT OF ECOLOGICAL PERFORMANCE</b>
<b>I. Analysis of Settlement</b>
<b>Analysis of Natural Environment</b> Settlement and site Topography Microclimatic conditions Relationship with sun, earth, air and water Landscape Natural Hazards Geological conditions
<b>2. Analysis of Built Environment</b> Relationship between houses Infrastructure Traffic Condition Economical Conditions Socio-cultural Conditions Historical places
<b>II. Analysis of Relationship with Outdoor and Garden</b>
Relationship between outdoor and indoor environment Vegetation
<b>III. Analysis of Houses</b>
<b>1. Design</b> Building Form Site Design Space Organization Interior Dimensions <b>2. Structure</b> <b>2.1. Material</b> Using Material / Economic Performance Material Production Efficient Material / Ecological material <b>2.2. Shelter</b> Thermal Comfort Conditions Natural Ventilation (Windows, doors,...)
<b>IV. Management / Maintenance</b>
Changes and Additions Maintenance Waste-management

Table2. Ecological Evaluation Criteria

## 2.2. Evaluating the Present Day Situation / the Contemporary Architecture in Ecological Architecture Principals

Vernacular architecture is abandoned due to it's been considered insufficient, uncomfortable, and useless in our country as in the rest of the world. The similar buildings appear in the different climatic zones without caring about the environmental conditions, and one city in one region looks alike to another one in another region. Designing using different materials, and technical gear, goes ahead of the tradition. Also, these designs have destructive affects on resources, as they do not resemble to the natural environment they are located in. Van Der Rayn summarizes the subject as below:

“Both urban planners, engineers and the othe other design professionals are trapped with standardized solutions which requires lots of energy and resources to complete. These standard templates which are unconsciously adopted, and multiplied in big numbers, are easily accessible as instant receipts on the shelves. As a result, it might be called unthoughtful design which does not respect to the health of socities and ecosystems. (Van Der Ryan, S., Cowan, S., 1996) (But in vernacular architecture, we have the principal of not building the same in everywhere.) Vernacular can be seen more in the rural settlements. The settlements where we have the traditional buildings, and the modern buildings together, the problematic sides of the present day constructions are mentioned comparing them with the traditional ones. Present day seashoreline buildings from the popular resort town of Antalya are compared with the traditional settlement texture of the same town, where we see the multi-storey hotel compounds built along the seashoreline interrupts the breezes, which is vital for the cooling of the area. It is not only the tall buildings interrupting the breezes, the building form which makes the building over-heated due to solar affects etc. Then all these problems are tried to be solved by using technology – air conditioners. (Figure 11)



Figure 11. Traditional buildings and seashoreline buildings.

### 2.3. Vernacular Architecture Inspiring the Present Day Designs

There are two groups of architects, designing ecological buildings; the first group is more employing the advanced technological achievements, and the second group is employing the basic solutions depending on the inherited experience and knowledge. Architects like Hassan Fathy, Rasem Badran, Raj Rewal are belonging to that second group of architects. They are well connected to the local building traditions and reject the architecture, which is not familiar to the built environment. “Hassan Fathy, as well as concentrating building economy based on traditional building material and technics, climatic comfort possibilities, tectonic-aesthetic expressions of the traditional culture, he tried to reflect all the identity requirements of the family groups making the village population.” (Yücel Atilla, 1994)

In the “Environmental Design” class, the designs of these architects, and their relations with the local architecture is studied as well. For example, Sana, Yemen is explained together with the analysis and the critics of the settlements by Rasem Badran. His recently completed buildings in the area are credited as the solution for the ecological problems in the area. The ecological implications of the buildings are explained, indicating how well it is corresponding to the ecological principals.(Figure 12,13)



Figure 12. Yemen / San'a  
(Skylife magazine,2006-2)



Figure 13. Saudi Arabia / Riyadh  
King Abdul Aziz Foundation for  
Research and Archives  
(<http://archnet.org/library/sites/>)

## 2.3. Student Papers

As we advance in the subjects, in the 3rd or the 4th week of the course, the students are asked to pick up their paperwork subjects. They are encouraged to make research on the traditional architecture of their hometowns, which they are more familiar to, and it gives them certain advantage. They would understand the subject better, after the observations and the evaluations in the place they are more familiar and confident. And the students from the other countries mostly study the traditional architecture of their own countries. This way, during the presentations, all students have the access to a very wide spectrum of samples from all over the country and the other countries as well. Students are asked to analyse and evaluate their subject area's houses, as on the shown samples, and deliver the paperwork in poster form. There are not many contemporary ecological architecture samples in our country.

Some of the above mentioned paperworks' titles are as follows: "The Evaluation of Nomadic Shelter Systems in Mongolia"(Figure14, "Comparison and Evaluation of Safranbolu and Mardin", "Evaluation of Safranbolu Houses Thermal Comfort Conditions".

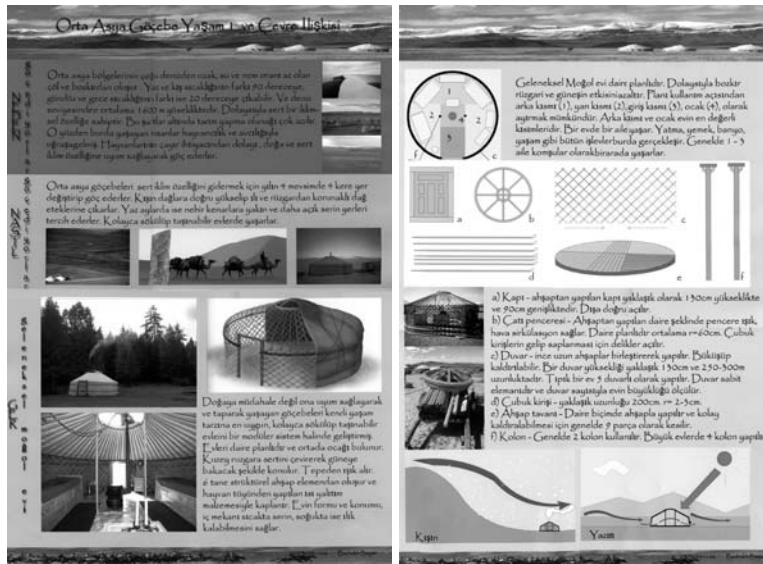


Figure 14. Students' Papers, "The Evaluation of Nomadic Shelter Systems in Mongolia 2007

Further research is going on in order to develop the course. There is another design studio class proposed, as a continuation of this course, where the students will be ecologically rehabilitating, and improving these houses to the modern day requirements, or improving their performances by employing a little technology.

### **3. Conclusion**

The most of the present day settlements, building environment relations are neglected. The life styles of the people living in those buildings are not considered. The climatic problems are left to be solved by using technological devices. Nature and human health is not given enough importance. Wasting energy and resources is enormous. For all these reasons, it is vitally important to record the the ecological principals in the traditional settlements, and to interpret them for determining the criteria to inspire the present day designs.

Environmental design course is important in the context of teaching ecological architecture, especially when the subject is becoming more and more popular. Teaching the course in the early years of the architectural education program, gives the benefit of gaining the student a certain ecological perspective and awareness both for the advanced years of the education and the professional life; how the climate is input into design, utilizing wind and solar affects in order to reduce the energy requirement of the buildings... As the course is optional, it is open to all the students from different years. But it should be obligatory for the early years' programs, as ecological architecture is not a choice, it is a must. And architects should give up, designing and building more uniform standard glass and concrete buildings, try to produce more location specific solutions, considering natural environment as a design input factor.

Therefore, it is a very proper approach to use the traditional architecture as the teaching tool of ecological architecture. And the absence of the present day samples, and the worries of showing samples to students, makes the subject even more important.

## **Referances**

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