

Sustainable Interior Design: A Course Proposal

Begüm Gökdağ^a, Simay Özkan^b

^a Department of Interior Architecture and Environmental Design, Graduate School of Fine Arts, Hacettepe University, Ankara, Turkey

^b Department of Interior Architecture and Environmental Design, Faculty of Fine Arts Design & Architecture, Atılım University, Ankara, Turkey

Keywords: Sustainable Design Course, Sustainability Education, Sustainable Interior Architecture, Course Proposal

Abstract Sustainability is an idea that affects every sector, every part of society and that everyone should be aware of. There are a few sectors that perhaps need to act hastily on this issue, and the construction sector is one of them. In order to prevent or minimize the damage caused by the construction industry to nature, a lot of work falls on not only the industry but also the academy. In this sense, interior architecture students who will be responsible for the built environment in their professional life should learn the principles of sustainable design in their undergraduate education. In this study, an elective course proposal was prepared for interior architecture students in the light of the data obtained from the previous study.



Introduction

Sustainability is an idea that affects every sector, every part of society and that everyone should be aware of. There are a few sectors that perhaps need to act hastily on this issue, and the construction sector is one of them. In the analysis made by the IEA (2021), the floor area built in buildings worldwide increased by approximately 65% between 2000 and 2020, reaching 245 billion m². On the other hand, energy use per m² decreased by approximately 25% in 2020. Although this rate is a positive development in terms of energy efficiency, it partially balances the floor area growth. For the world to reach Net Zero by 2050, energy use per square meter needs to be reduced, but more than 3.5 billion m² of buildings were built in 2020 without performance requirements, as nearly two-thirds of countries have not made Net Zero goals a policy priority. (IEA, 2021). The most basic way to achieve the Net Zero goal is to raise awareness of all segments of society about sustainability. In this regard, the United Nations has determined the period of 2005-2014 as "Decade of Education for Sustainable Development" in order to educate the decision makers of the future on this issue and has taken steps in this regard. In the published

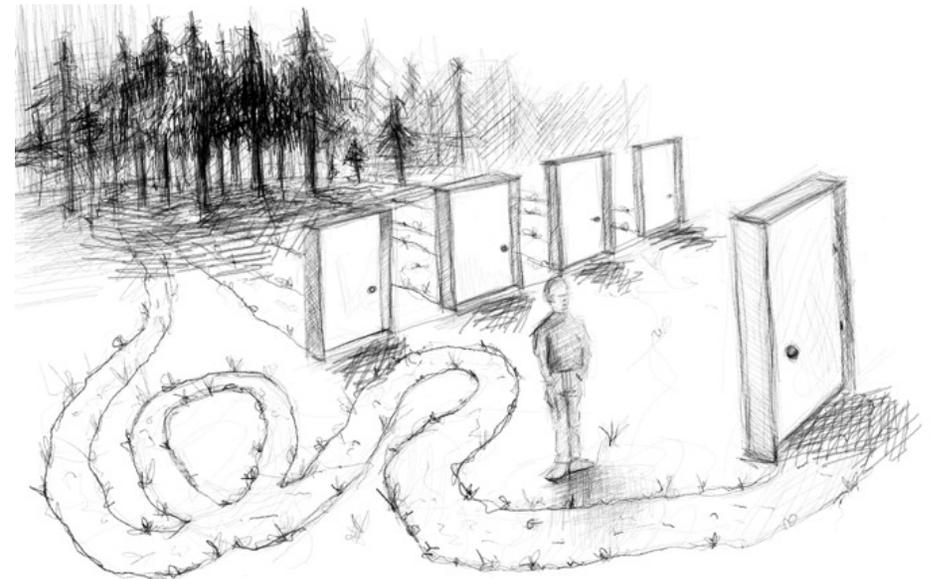


report, there are suggestions for the implementation of this action, such as encouraging quality education, reorganizing education programs, educating the society and practical training. (UN, 2005). This education movement, which was started in 2005, is continued until 2030 with a statement published in 2019 (UNESCO, 2019).

However, in order to prevent or minimize the damage caused by the construction industry to nature, a lot of work falls on not only the industry but also the academy. The key to solving this problem is in sustainable design, the only way to apply the principle of "meeting the needs of today without compromising the future". Designers who know sustainable design principles can provide positive change through their designs (Moxon, 2012). However, in order to achieve this, they need to receive a quality education and learn about sustainable design in all its aspects.

Until recently, interior architects' relationship with sustainability was limited to recyclable local building materials or energy-efficient lighting. Systems based on building performance and strategies for resource conservation were emerging as the domain of architects and engineers (Pilatowicz, 2015). In this process, a certain point has been reached on the basic principles of sustainable design, both academically and professionally, but this basic knowledge needs to be developed. Since sustainability is an approach where many concepts come together, it is difficult to evaluate and teach as much as define it (Stieg, 2006).

In order to implement the sustainable design approach, interior architects must first ask the right questions and know how to eliminate potential problems that may prevent sustainable design. In other words, for the interior design project to be sustainable, the interior architect must understand the principles of sustainable design and the effects of these principles on energy and water systems, building materials and construction methods (Moxon, 2012) For this, it is necessary to include sustainability in interior architecture education and the content taught should be suitable for the definition of the profession that students can use in their professional lives after graduation



Methodology

This study is a two-part study. In the first part, contents that the undergraduate students in interior architecture departments in Turkey are learning about sustainability were examined. The universities examined in the analysis were selected from universities whose weekly course schedules can be accessed online, and as a result, a sample group was formed from 11 universities. In the analysis made in the first part of this study, it was seen that the contents were disconnected from each other in some universities. In addition, it has been observed that passive-active systems are the most taught content in the weekly curriculum of 11 universities. Passive-active systems are followed by thermal comfort and sustainable materials seen in 7 interior architecture departments. Lighting, green building certification systems and water conservation are other topics included in the weekly programs (Table 1). In addition, it has been observed that all of the 11 departments do not include waste management. Based on all these observations, the taught contents were compiled and a weekly course schedule was created. The order of the subjects to be taught in the weekly program was designed by considering the order in the weekly contents of the sample group. At the same time, in this study, publications on the integration of sustainability into the interior architecture curriculum in Turkey were compiled and various additions were made to the proposed curriculum.

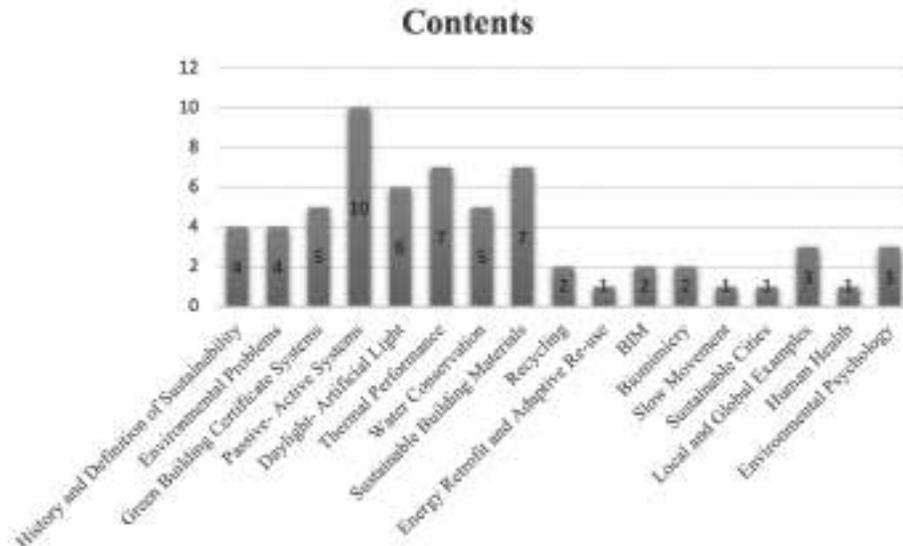


Table 1: The contents of the courses taught to undergraduate students of interior architecture departments at universities included in the sample group analyzed in the previous study (Gökdağ & Özkan, 2021).

Alternative Teaching Methods Tried in Turkish Universities

After an interior architecture studio study organized in partnership with the industry, 73% positive feedback was received in the survey conducted with 98 interior architecture students. In the course, which was planned as 8 weeks of theoretical knowledge and 7 weeks of practical knowledge, experts in the subjects taught as theoretical knowledge were invited as speakers. At the same time, a tour was organized to a building that received LEED Platinum certification. In the application part of the course, it was critical to work with a company one by one. After this study, the findings about whether the students found this study important or not were published as follows; 47% very important, 20% moderately important and 25.5% important (Afacan, 2014). In a cross-cultural study, interior architecture students of both universities learned the course contents through video conference. After learning the theoretical knowledge, the students were expected to form a team with the students of other university and to create a design project together to cover the content they learned. In the evaluation made after the course was over, the knowledge of the students was found to be almost the same and highly positive (Taşlı Pektaş et al., 2015). In another studio study, students were expected to make sustainable design as a designer. In the first weeks of the course, students were asked to gather information about sustainability and make a presentation in the light of the information they gathered. In the second part of the course, students were expected to design by giving a checklist prepared by the instructor and divided into 4 main headings: energy, material, water and health. At the end of the course, it was recorded that 75% of the students who did not have current knowledge about sustainable design were successful (Karlı, 2013).

Sustainability in Interior Design Course

This course is planned as an elective design-oriented lecture/seminar course. The aim of this course (Table 3), which is proposed with the name of "Sustainability in Interior Architecture", is to teach the definition of sustainability, its purpose and its importance in interior design/interior architecture, and to ensure the student to design future projects by considering sustainability criteria. It has been observed that the most preferred contents by the sample group are the definition and history of sustainability, environmental issues, green building certification systems, energy efficient building design, daylight control in interior space, thermal comfort, water conservation, sustainable building materials, local and global building examples, and environmental psychology. These contents were taken into consideration while designing the course proposal.

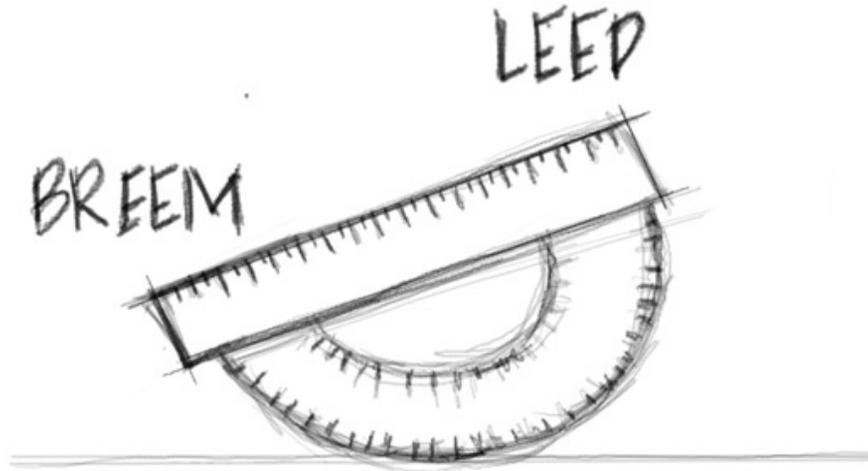
This course is divided into 4 parts. The contents in the first part are environmental issues, the history of sustainability, fossil fuels, renewable energies and certification systems. The second part consists of elements that increase the building performance, materials, local architecture and ways to transform the existing building into an energy efficient building. In the literature review, it was seen that success was achieved in the studios where the students came together with the professionals. Based on this, in the third part, it is important for the students to have information about the industrial equivalent of the theoretical knowledge they learned and the practices made in Turkey, in order to understand the professional dimension of sustainability. There is also an analysis and presentation of a building chosen by the student from Turkey or the world in this part. This work can also be in the form of group work. In the last part, the student is expected to draw the energy retrofit project of the design he/she has planned in the design studio in the 4th semester. The last part of the course is designed to be supported by critiques and then to end with a presentation to the jury.

In the curriculum created by using the teaching method suggested by Stieg (2006), it was

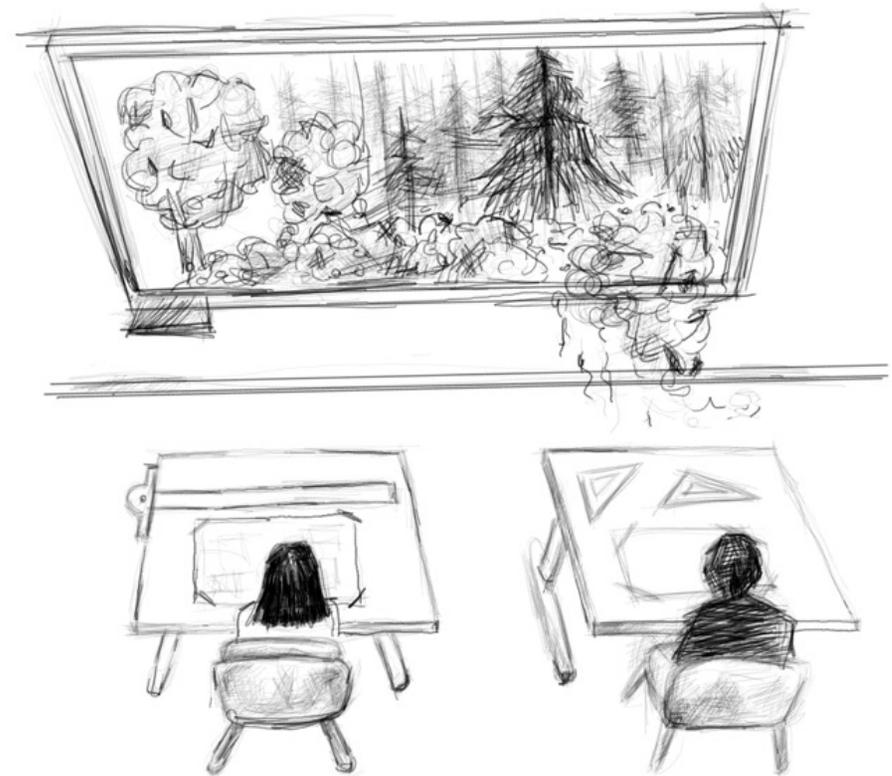
thought that the student's learning about environmental problems first would enable them to establish a logical relationship with the later parts of the course. The first two weeks are divided into four parts, and it is aimed to prepare the student for sustainable building systems. In this sense, in the first week of the course, it is aimed to teach environmental problems, their effects on the ecological order and the history of sustainable development. In the second week, it is planned to provide information about fossil fuels,

their effects on the world and renewable energy sources. In the second week, it is also aimed to explain green building certification systems, especially LEED and BREEAM. Apart from LEED and BREEAM, although there are quite a few certificates used in the world, most of them serve on a local scale. One of the main reasons why especially these two certificates are popular today is that they are quite old, and secondly, they get a lot of applications because they adapt their certificates to different building types. (Vierra, 2019). Since Turkey does not yet have a green building certification system of its own, LEED and BREEAM certificates are generally used for rating sustainable buildings built in the country. BREEAM and LEED also have points where they differ from each other. For example, it is seen that there are more criteria in BREEAM for building materials, which are one of the cornerstones of interior architecture. (Kobaş, 2011). Because of this and many other differences, green building certification systems, especially pioneering certificates, should be included while providing sustainability training to interior architects. In this way, before learning about sustainable building systems, students will have preliminary information about the criteria by which this type of building is evaluated.

Stieg (2006) stated that an interior architect at number 3 of the sustainability training steps should be able to explain to his/her client and business partners why a building should be sustainable. From this point of view, in the second part of the course, it has been seen that it is necessary to show the sustainable building design steps to increase the building performance and user experience. In this sense, the subject of waste management, which is not included in the sample group but is of great importance for sustainable buildings, has been added to the curriculum. The reason for this is the damage caused by the buildings to the environment. Buildings cause environmental pollution by spreading toxic dust and other air pollutants and harmful wastes around them (Amaral et al., 2020). In this sense, it is thought that an interior architect should have an idea about this issue during sustainable interior design education.



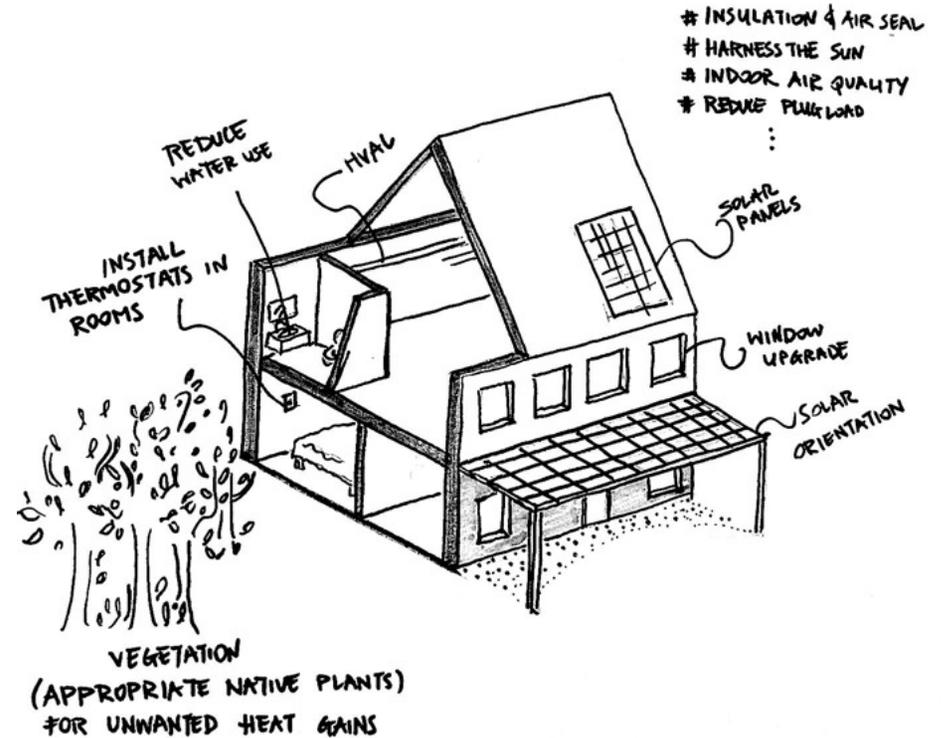
Another step mentioned by Stieg (2006) is the commitment step, which states that sustainability should become a lifestyle. In order to achieve this, students are expected to both participate into industry collaboration lectures and present a green building of their choice with all its components. By examining the buildings that have received green building certificate with their theoretical knowledge, they will have the opportunity to see how the systems they learned are integrated into the buildings. After this step, they are expected to show all the knowledge they have learned so far with an energy retrofit project. Today, considering the building stock, applying an energy retrofit project to existing buildings has come to the fore. It has even been announced that the government will provide financial assistance for energy efficiency and low carbon heating systems to be built in existing houses in the UK. (Gov.uk, 2021). In particular, the UK focuses on and encourages energy retrofitting. Considering the potential of more countries to give importance to this subject in the future, it is thought that students studying interior architecture should learn this subject with both theoretical and practical knowledge in undergraduate education.



For the energy retrofit project, the students are expected to make the project they submitted in the previous semester sustainable with the knowledge they learned after taking sustainability lessons. The main purpose of this course is to inform the students about the systems used and to raise awareness and make them feel the need to learn more about this subject

Course Name	Semester	Theory (Hour/Week)	Application (Hour/Week)	Laboratuary	Local Credit	ECTS
Sustainability in Interior Design	Fall/Spring	2	1	0	3	4
Prerequisites	The student must have passed the 4th semester design course.					
Mode of Delivery	Face to face/Hybrid					
Course Objective	The main purpose of this course is to provide students with both theoretical and practical knowledge about sustainable interior design. From the beginning to the end of the course, basic information about sustainable interior architecture is taught, and in the last part, the student is expected to apply an energy retrofit to the project he/she has designed before.					
Learning Outcomes	Successful completion of this course will bring students to 1. Learn environmental problems, renewable energy sources and their usage areas in building design. 2. Learn the most used green building certificates and the necessary conditions for a building to obtain these certificates. 3. Learn about passive and active building systems and their core principles 4. Learn both ensuring energy management and user comfort in the building through different applications such as daylight control, light, ventilation, thermal comfort, waste management, water conservation, etc. 5. Learn the materials that can be used in the interior, the importance of local architecture and the effects of using local materials, 6. Learn ways of using recyclable materials in furniture design 7. Learn to put into practice all the theoretical knowledge learned about sustainable space design.					
Course Content	Environmental problems and the effects of these problems on the ecological balance, the reason for the idea of sustainability, elements that make a building sustainable, evaluation systems of these elements, definition and advantages of local architecture, energy efficiency of the existing structure and sustainable materials that can be used in both the building and the furniture constitutes the content of this course.					

Table 2: Course Information



Weeks	Topics
1st week	Environmental Problems
	History and Definition of Sustainability
2nd week	An Overview of Fossil Fuels and Renewable Energy Sources
	Green Building Certificate Systems
3rd week	Passive Building Design
4th week	Principles of Building Technology: Light
5th week	Principles of Building Technology: Thermal Performance
6th week	Principles of Building Technology: Waste Management
7th week	Principles of Building Technology: Water Conservation
8th week	Sustainable Building Materials
9th week	Industry collaboration/lectures
10th week	Presentation of Case Studies (Midterm Submission)
11th week	Energy Retrofit Design
12th week	Integrated Design Studio: description of the project and answering questions
13th week	Critic
14th week	Critic
15th week	Critic
16th week	Jury

Table 3: Weekly Course Outline

Conclusion

The main purpose of this course proposal is to provide undergraduate interior architecture students with a holistic knowledge of sustainability. Due to the intensity of the course content and the complexity of sustainable design, it is of course not possible for a student who only passes this course to make a successful sustainable design in the future. However, this course proposal is important for students to have an idea about sustainable design issues, to learn which methods should be applied to make an existing building sustainable, and to learn the responsibilities of the interior architect in this process. It is also important that students who took or are taking basic interior architecture courses such as interior architectural detail, installation, lighting, acoustics meet with the sustainability part of these basic subjects and have awareness in a sustainability manner.

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