Abstract: A series of design studio projects on sustainability and design was initiated in 2017 at İstanbul Bilgi University, Department of Industrial Design. The series aims to lead the students to think, discuss, and get aware of their responsibilities on their decisions, about the environment, living things and resources in design projects. For this purpose, a design studio course encompassing the processes and methods of sustainable design was structured. The topic was the context of a locality in Turkey, outside the campus and within daily life, so the students would directly relate with these responsibilities. Similarly, the structure and project briefs of the studio were determined through a direct interaction with the locals and the local knowledge of the region. Aiming that, and in line with certain methodologies of sustainable design, three visits were made to the site during the semester; the first by the coordinators before the semester started, the second and the third with the students and coordinators, for research and project development phases. The research phase was based on the core topics related to sustainability and the region: built environment, culture, food, energy, waste, and water. During the project development the students focused on one of these topics and built vision scenarios for future on the grounds of the past and present of the village, and proposed system and product designs to facilitate reaching their vision. They shaped their design ideas on the grounds of the local context and shared their projects with stakeholders and the inhabitants.

Keywords: sustainability; industrial design education; systems thinking; design camp; local and rural

1 Introduction

Design is defined as an area tackling with “wicked problems”, which are “social system problems”, in which many stakeholders with “conflicting values” are involved within a “thoroughly confusing” context (Rittel & Webber, 1973; Schön, 1987; Buchanan, 1992; Irwin, 2015). Defined as such, the practice of design is supposed to consider the intricate web of relationships and influences within which it operates. The designer's role is to be aware of the consequences of each decision and action throughout the design process and design accordingly. Such awareness necessitates a wider look at the design problem at hand, in terms of who and what will be affected, when and where.
the impact will expand. A broader and closer approach to places, times and actors is essential. Design, proposed to naturally involve such an approach, is being defined and practiced in such a wider sense more and more, today (Irwin, 2015; Ceschin & Gaziulusoy, 2016).

1.1 Sustainability and Sustainable Design

Defined as tackling with wicked problems, design practice is associated with the current issues of sustainability, which are also wicked in nature (Tonkinwise, 2014; Irwin, 2015). Sustainability involves environmental, social, economic issues, all of which are within the realm of design projects (Tischner, 2006; Irwin, 2015). Design activity proposes situations in which resources are altered, combined, used in ways that effect related stakeholders within wide areas and long durations. Thus, the designer takes on the responsibility of making decisions for the living and non-living things in the world. This basic definition of design activity holds a holistic approach, similar to that of systemic thinking, to which design is increasingly associated, especially within the area of sustainability (Tischner, 2006; Irwin, 2015; Battistoni & Barbero, 2017). The close connection inherent between design and sustainability has been studied by design community, where design is applied as a tool to challenge problems wicked in nature (Papanek, 1984; Irwin, 2015; Ceschin & Gaziulusoy, 2016).

People within the area of product design are bound to be able to answer the questions of what product is designed, how and why (Tischner, 2006). A designer should evaluate the context and necessity of a design project in relation to the above-mentioned responsibilities (Papanek, 1984). The context and the necessity of a product is determined through studying the space the project will cover within the actual life, a must in tackling with wicked problems. The designer, who skips these evaluation processes and who does not question the place and the reason of design projects in real life, would probably “best not design” (Papanek, 1984). Still, professional design practice or the educational programs in design, does not cover issues of sustainability, sufficiently (Tischner, 2006). Even though design activity is to deal with the complexities of wicked problems, it seems to miss its capacity and approach design problems from a narrow perspective.

1.2 Product Design Education and Sustainability

Studio-Sustain series adopts the idea that design education and practice are determined by the people, situations, necessities, needs of real life (Tischner, 2006). Instead of assigning students with a predefined brief, the course initiates by presenting them a context which they will be a part of, experience, analyse, and then form a project idea. Thus, students bring out the need and causality of their design projects out of the given specific context. While questioning what and why they design, students also take the responsibility of their decisions on what to be sustained, why and how. Design education programs on sustainability also include humanitarian content into their curriculum for “a new generation of compassionate designers with global awareness, local engagement and personal integrity” (Tischner, 2006). In addition, they adapt the approach of “holistic education” which suggests “seeing things as a system (or wholes within wholes)”, also stated in the sixth property of wicked problems: “Every wicked problem is a symptom of another, higher level, problem” (Rittel & Webber, 1973; Forbes, 1994; Battistoni & Barbero, 2017).

2 Studio-Sustain Urla-Barbaros

In Summer 2017, the coordinators of Studio-Sustain decided initiating a studio course series on sustainability and design. It was important that the first of this series would be about a site outside the city. Essentially, students and coordinators would get out of the campus and the city they live in, and study the specific context of another region. The first property of wicked problems suggests, “wicked problems have no definitive formulation, but every formulation of a wicked problem corresponds to the formulation of a solution” (Rittel & Webber, 1973). Consequently, students would be given the context which they can study, and then, frame the problem from their point of view. By working directly on-site students could experience “co-design processes starting with the consumer/customer needs and aiming at maximum social, environmental as well as economic sustainability” (Tischner, 2006).

The field-study was planned as a design-camp where students and coordinators would get in a collective living-working setting among themselves and with local people. The camp format was both a concept of focusing and working on a subject collectively, and a physical activity. Students would get out of their comfort zone and encounter, study, understand the reality of another region in an intense, concentrated way. Camping enables living and experiencing the site temporarily, getting out of the usual routine, creating a hub that attracts local people and institutions on sustainability and locality. As an alternative to design-studio in the campus, the design-camp is proposed to be a multiple learning, sharing, experiencing environment (Kıyak İngin, 2004).
Upon evaluating the alternatives for the site to be studied in this first implementation outside campus and İstanbul, Barbaros village was selected. The close connection with the Building Biology and Ecology Institute (1), located in the village and active on sustainable design, was significant in the decision. As the Institute informed, the locals in the region were active on sustainability issues and were open to working with a group of students and coordinators visiting the region. Barbaros village is located in West Urla Region, within Urla municipal area, west of Izmir. Urla, whose history goes back to 2000 BC, hosts coasts, villages, valuable agricultural lands, natural landscapes as well as historical, cultural, architectural values (IZKA, 2014).

In Turkey, by 2012, villages turned into neighbourhoods by law 6360 (2), which caused a fundamental change in administrative and structural status of these areas. This issue was essential while working on-site and was discussed with local people and institutions. Within the studio context, the region is intentionally called village instead of neighbourhood in order to emphasise the importance of sustaining the potentials, abilities of villages as villages. During the studio three site-visits were made, all for a duration of four-five days. The first one was the pre-visit by the coordinators, while the second and third ones were the two design-camps of students and coordinators.

In the very beginning, sustainability was addressed in a general sense. The topics of sustainability suggested by Day and Mindbjer (2007), “buildings, food, goods, waste, economy, traffic, water, rainwater, flooding, sewage, air, energy, trees, wildlife, micro-climate”, were re-categorised according to the region and established the basis for the first phase of the studio. The issues to be followed in the first research phase were: agriculture, built environment, climate, economy, energy, local and regional production, natural resources, transportation, village culture, waste, water, wildlife.

2.1 Pre-Visit to the Site and Semester Planning
Before semester started, the coordinators made a four-day visit to the site in order to explore, understand the region, to meet local people, institutions and to plan, organise the semester and the design-camp. They stayed in the village, had meetings with stakeholders, made a preliminary study on the above-mentioned topics in the region (Figure 2).
2.2 Interactions: Sustainability and Sustainable Design

Studio-Sustain Urla-Barbaros started in Autumn 2017, with 18 students of third and fourth grades, two coordinators and an assistant. As one of the main intentions of the series, the semester started by hosting and visiting people and institutions working on sustainability and sustainable design, creating a dynamic relationship between the studio-class and outside the campus.

In the beginning of the semester, the focus was sustainability, sustainable design and pre-research on the site. Related people and groups were invited to the studio, while visits were made to related collectives to see and practice some examples. Architect Süreyya Topaloğlu who studied the region for her masters, shared information on the site. Artıkişler who study the waste cycle in cities, Dürük who question the ways of food production and consumption, Ege Okal and Senem Tüfekçioğlu who practice and study Permaculture were some of the visiting experts. During a one-day visit to the Permakamp in Beykoz, Güneş Savaş told about the camp, students analysed, practised permaculture. Ayça İnce from the urban farm and restaurant Ek-Biç-Ye-İç presented their sustainable food business within the city (Figure 3).

Permaculture is one of the key themes of Studio-Sustain. It was an “inspiration” for Transition Design, which proposes that “the transition to sustainable futures is a design process that requires a vision, the integration of knowledge, and the need to think and act at different levels of scale, and that is also highly contextual” (Irwin, 2005). Methods, processes of transition design were adapted by Studio-Sustain and was introduced with a kick-off workshop.

2.3 A Workshop: Sustainable Design and Systems Thinking

Studio-Sustain was based on the methods within the studies and practices in the area of sustainability and design. In order to introduce the basic definitions and methods Dr. İdil Gaziulusoy, the head of Nodus: Sustainable Design Research Group at Aalto University, was invited for a seminar and a one-week workshop (Figure 4).
Design for Sustainability has evolved from a technical approach based on product design into a broader study of systems and products within these systems (Adams et al., 2016; Ceschin & Gaziulusoy, 2016; Irwin, 2015).

“The current understanding suggests that sustainability is a system property and not a property of individual elements of systems. Therefore, achieving sustainability requires a process-based, multi-scale and systemic approach to planning for sustainability guided by a target/vision instead of traditional goal-based optimisation approaches” (Ceschin & Gaziulusoy, 2016).

This gradual change also includes differences in the issues of sustainability from more environmental topics to more social ones (Ceschin & Gaziulusoy, 2016). Also suggested in the studies, is the varying scales of contexts. There are micro contexts, "places", which, together, form macro contexts, "spaces" (Manzini, 2015). Interventions made on micro contexts eventually make a change in macro scales and the designer needs to consider both scales, simultaneously. Studying micro contexts includes developing design ideas and projects through field study, working on-site and with locals. In such a transition design process, "speculative, long-term visions of sustainable lifestyles fundamentally challenge existing paradigms and serve to inspire and inform the design of short- and mid-term solutions" (Irwin, 2015).

During the workshop the campus was taken as the demo-site, where students could work directly on-site and implement the methods of research and visioning. By studying the familiar setting of campus, students would experience the attitude, approach of sustainability on the basis of a daily micro area, and then transfer this experience, approach, methods to the village. One of those methods were the Iceberg Model in which a present issue, or "event", is analysed through the ongoing patterns, structures, mental models shared by people. Another method was the Seeds of Change, which involves 'looking for clues to solutions for sustainable futures in the context of the present and developing the ability to anticipate over long horizons of time' (Irwin, 2015).

Students were divided into six research groups. The above-mentioned topics of sustainability were adapted to the campus. The research groups analysed the campus on the basis of these topics, namely, built environment, campus lifestyle, energy, food, waste, water. On the grounds of their analyses, the groups proposed vision scenarios for 25 years into the future of the campus, which they visualised in collages. The campus inhabitants, locals, were called to participate in developing vision scenarios together. Finally, each group presented their research and visions, and processes for system designs were discussed (Figure 5).

2.4 First Design-Camp

The first design-camp took place for five days at the end of October, with all students and coordinators.

2.4.1 Research and Visioning

The first design-camp was planned in detail by the coordinators where students and coordinators stayed in the village, becoming part of the daily life. They gathered information, material on the region, had meetings, made interviews...
with related people and institutions. Among them were Building Biology and Ecology Institute, BUKöyDer (West Urla Villages Association) (3), the mukhtar, the Municipality, the village bakkal, the village kahve, the village lokanta, a villager who collects seeds and plants them in her garden, an architect who designed and built his own house in the village with local materials, all significant figures in the area (Figure 6).

Students, working as the same six research groups, implemented field-study on the basis of the topics of sustainability, as determined in the beginning of the semester. The topics were distributed as: built environment and natural resources; agriculture and wildlife; village culture and local production; natural resources, energy, water, climate; regional production and economy; waste and transportation.

The group working on natural resources documented, categorised the distinct types of local plants through drawings, photographs, videos, collecting actual plants. The group working on waste analysed, categorised the garbage and other waste of the village, in drawings, photographs. Some looked into the seed archive in the area, also visiting villagers in their homes to learn how they plant, cultivate in their gardens (Figure 7).

The neighbouring villages and Urla, as the administrative centre, were also included within research. The first two days, groups collected data and started building visions on their specific topics. On the third day, they presented their findings and vision proposals to the related people of the village and received direct feedback from the stakeholders. After the presentation, which was an occasion of mutual, collective thinking-learning, students carried on researching
on the grounds of the feedback. The last two days, groups evaluated their proposals, ideas, made more interviews, talks with the locals, collected material, data (Figure 8).

Additionally, students and coordinators visited Urla Municipality, presented Studio-Sustain Urla-Barbaros to the Head of Municipality. They were able to learn about the vision, perspective, agenda of the municipality on related issues and to get feedback from the authorities, directly.

2.4.1 Research and Visioning
Returning back to campus, students concentrated on organising, interpreting the material. They used mind-maps, various mapping techniques to situate, organise, visualise their research and ideas (Figure 9).

Students developed their visions on-site, on the basis of direct interactions in interviews, talks and time spent with the inhabitants, their observations, existing projects, plans, activities of the local municipality, groups, institutes, associations, and the vision of the village: "Reviving the traditions, putting forth our production potentials without harming the serenity of our village, ensuring our sustainable progress without compromising the blessings rural life offers us!" (4). They proposed future visions and visualised them in collages, some of which were "a valued, embraced, united Barbaros", "a herby, herb informed, colourful Barbaros", "a self-sufficient village", "village: 1 waste:0" (Figure 10).
2.5 System and Product Design Proposals

After research and visioning, students started to work on their system and product design proposals, determining the context of their design projects on the basis of the field-study. The focus was not what students and coordinators brought to the site but what the site shown, taught them. Six research groups dissolved and students started to work on their design ideas individually or in groups of two. They proposed system designs for the next two-year time and product designs that would function in and facilitate these systems, both planned to be the means to reach the future vision they suggested. They presented their proposals, received feedback in a midterm jury before the second site-visit (Figure 11).

2.6 Second Design-Camp

The second design-camp took place at the end November, staying in the village for five days.

2.6.1 Developing Systems and Products

During the second design-camp, students were to directly test and try out their system and product proposals. They experienced relevant activities, production processes, got feedback and advice from the locals and stakeholders, made further research specific to their areas. Before the visit, the coordinators guided the students to plan their second-camp and, on-site, facilitated students and locals to collaborate for testing ideas and proposals.
One student, who proposed the use of permaculture methods in villagers’ gardens, tested his ideas using waste material of the village to create permaculture units in one of the gardens in the village. Another group tried out natural dyeing methods collaborating with the textile workshop in the village. Some were guests of the villagers being part of the daily production in the hosts’ house and their field, while some others learned the making of the local hat of the village (Figure 12).

The first day, students worked intensely, trying out, experiencing specific practices and processes related to their proposals. On the second day, they presented their system and product proposals to the villagers and related people in the region. On the basis of the feedback, opinions, critiques they received, they planned the next three days, and carried on testing and trying out their proposals accordingly. Meanwhile the coordinators visited the Municipality, presented students’ proposals to the Head of the Municipality and received her feedback (Figure 13).

2.6.2 Back from the Site: Finalising System and Product Designs
Returning back to class, students went on developing their system and product designs on the basis of their experience and further research in the village. They worked on detailed system scenarios and product designs that are central within these systems.

Their system scenarios included "establishing a tradition of production with collaboration of local women producers by creating a village brand", "vacations where volunteers socialise with villagers and among themselves, experience village life helping out the villagers during harvest", "creating communal areas throughout the village to trigger relationships among locals, and using units to direct the inhabitants to these areas", "building a village calendar,
archive, in time through local products of the village and at the end experiencing these products altogether” (Figure 14).

2.7 Final Designs

Students developed their system and product designs simultaneously, elaborating systems in storyboards, scenarios while improving their products through drawings, mock-ups, two processes that helped refine each other. They presented their final designs in a final jury (Figure 15).

2.8 Back to the Village: Exhibition On-Site

At the end of the semester, studio outputs where shared with the village, electronically. The plan was to revisit the site when the village organised its traditional, local festival for the third time. The coordinators visited the site in September 2018, during the festival with print-outs of student projects and photos of the studio process. They set up the exhibition and made a presentation of the studio, and received very positive feedback from visitors and the locals. After the festival the exhibition stayed on-site. Some of the stakeholders organised a meeting to discuss the process and output of the studio (Figure 16).
3 Conclusion

The first of the series of Studio-Sustain can be evaluated in terms of design education, the site and sustainability.

3.1 Design Education: Students

Making research on topics of sustainability and using methods of sustainable design on-site, students developed future visions for the region. They proposed system and product designs to be facilitators in reaching these visions and finalised their projects through testing, experimenting on-site.

“How we approached vision-system-product altogether and how we built vision and system in order to reach the product, were fundamental” (6).

“Notions of sustainability and system design taught in the studio were different than my previous courses. I learnt the basics on sustainability in the presentations and visits during the semester, and consequently, grew an interest in natural dyeing and papermaking” (6).

“Studio-Sustain was quite nurturing, informative. It was unique, interesting that we would travel to another location and work on-site. We were not used to work, live or design in a sustainable way. Throughout the semester I learnt system design, considering the ones effected within this system, using resources wisely and realised that design is a whole, not just the product” (6).

One of the themes was that students would question what they designed and why, and their responsibilities to the context, the site and their design projects.

“I started to think of sustainability and design within a different context. I realised that social innovation necessitates considering the traditions of collective production, collaboration, participation altogether” (6).

“Apart from design educational processes, it also contributed to our social skills. Besides, it was very improving to start considering the materials, how each step I took would have an impact in terms of sustainability” (6).

“I experienced design in relation to different scales, environments, people than usual. What I gained was not just design-related. I learned about Permaculture which influenced me not only in the studio but in my life in general. I acquired new ideas on agriculture, sustainability, climate and villages in the country” (6).

Field studies were planned as design camps where the studio people worked outside campus and the city, on-site and altogether. These design-camps on-site were positive experiences for students, coordinators and the locals. An intense working set-up was formed within the short duration of five days, where issues of rural, local, sustainability were discussed, evaluated, collectively. Students formed their project briefs on the basis of their work on-site, consequently adopting the site and their design ideas better, which effected their learning and design processes.
"In the village we observed the context and discovered how we could create resources for sustainability. The most important point was collaboration. If we aimed for a truly sustainable system and product, our relations with the locals needed to be strong and they were to be involved within the system-product" (6).

"I conducted field study in real terms for the first time. The villagers' being very open-minded, collaborative and ready to help encouraged us. When we presented our work in the village, participation by locals was very high" (6).

"The villagers were really positive, open to our suggestions, and in only two visits, they really affected us. Our close relations with them were reflected in our warm, honest design approach, enabling us to design products and systems addressing real, thought-through problems” (6).

A design process including intense field-study in a distant location, wide scales of time and place is challenging even for professionals let alone for students. Even though this educational process is weighty for students and coordinators within a three-month semester, the iterative approach of going back and forth between micro-macro, local-regional, future-now is necessary within sustainable design.

"Time-management could be improved. A one-semester period is not enough for such a dense content of design studio. If there were three site-visits, we could finalise our designs on-site, even produce our products there and observe them being used in the village” (6).

"Barbaros village was difficult to get to from Istanbul. Next courses of Studio-Sustain could be planned considering the logistics” (6).

Students who could tackle with varying scales were the ones who changed their perception of the design problem and dealt with these scales, simultaneously. Students who worked on systems while making one-to-one trials on products progressed on both levels much faster. Working directly with stakeholders throughout the process facilitated students to compose more realistic projects, both as systems and products.

The design-camps on site were positive experiences for students, coordinators, locals. An intense work set-up was formed within five days, where issues on rural, local, sustainable were discussed and evaluated, collectively. Regularly, such field-studies in distant sites are organised as workshops or summer-schools of short periods. Integrating such a practice into a semester-long course, parallel to other ongoing courses and routines, makes Studio-Sustain a more challenging educational process, but also rare and unique.

"The studio had a nature of sharing, which strengthened the communication among students, and between students and coordinators. What caused this atmosphere was very simple: eating and enjoying together. This studio, which gives you the chance to get away from your own routine and to get in and experience others, touches not only your design approach, but also your life decisions” (6).

"Thanks to this studio, we encountered many things that we do not see or think in the city, and found out how we can be part of sustaining the nature offers us and that we consume day by day, through design. We discovered the diversity of resources for production and living, and vitality of supporting sustainability of local spots” (6).

3.2 The Site: Barbaros Village

Studying the village and the rural, which are significantly different from the city in scale and structure, necessitated adopting a distinct design language and system approach. We all distanced ourselves a little from what we previously knew on design and adjusted to this new situation. Considering the boundaries of the role and position of the university on-site, the coordinators gave upmost importance to study the region in a participatory and pluralistic way. During the studio process relations with the site were dynamic and positive. Locals in the village and area actively participated in the process and the studies implemented. Related people and institutions gathered together in students' presentations creating a setting of exchanging of ideas, thinking, discussing together. The findings of research process were shared with people in the meetings, and later in exhibition and presentation.

"What made the essential difference in Studio-Sustain, compared to other studies we organised in collaboration with other university groups, was that it was a semester-long project where students visited the village and lived with the villagers for four-five days. Such an intense study enabled the students to learn about the village culture and habits in-depth, and consequently, to achieve more sustainable and applicable design ideas. ... We
experienced that the approach of the tutors mattered more than the corporate approach of universities. Naturally, their horizontal communication and curiosity contributed very much in the students’ attitudes and the villagers’ adopting the study. They made everyone feel that they were on-site to improve education with the knowledge of the villagers and not to educate the village” (7).

“Students observed, analysed the village through curious and conscious eyes, under close supervision by their tutors. They were friendly and respectful with the villagers. ... University meeting the village to conduct a collective work was extremely helpful for identifying, sustaining, developing, efficiently using cultural resources and wealth. The village grew more aware of these resources. Students and coordinators staying in the village and interacting with the villagers during long durations got the locals closer to the group and university. ... The university group were in harmony with the village and locals. The villagers responded to the positive attitude of the group and helped them. Even friendships were born. ... We were reminded, informed about our cultural wealth. Our awareness of our natural resources developed. Discussing the values that identify the village strengthen our feeling of belonging” (7).

“As someone who was born and raised in the village, I think they had quite a warm, sensitive influence. ... I saw the exhibition and was moved. Photographs of studio people and villagers collaborating were perfect. The exhibition was well-received by locals and visitors” (7).

3.3 Sustainability: Sustainable Design

Studio-Sustain Urla-Barbaros got involved in the ongoing local studies, practices on sustainability and design. Connections with people and groups working on sustainability and sustainable design, in Turkey and abroad, were established while future collaborations are discussed and implemented. Studio-Sustain series continues taking a different local context as its subject matter each Autumn semester. Each location has its specific topic, character, properties, content that lead the studio course to take a different approach within sustainability. While tackling with issues of sustainability in varying ways depending on the specific context, the methods followed throughout design process within the course remain similar, although constantly reviewed, updated.

Notes

(1) http://www.yapibiyolojisi.org/
(2) https://www.tbmm.gov.tr/kanunlar/k6360.html
(3) http://www.bukoyder.com/
(6) Comments by students, anonymous.
(7) Comments by locals, anonymous.

Acknowledgements: The wonderful inhabitants of Barbaros Village, Building Biology and Ecology Institute, BuKöyDer (West Urla Villages Association), Urla Municipality, Oyuk Festival Committee and Mimas Sanatevi, the studio assistant, and the students.

References


**About the Authors**

**Simge Göksoy** Studied industrial design with a minor in psychology in undergraduate, and visual communication design in graduate degrees. Completed her PhD on industrial design education and post-doc on professional design practice. Taught visual communication design and industrial design in various higher education institutions in Turkey, South Korea and Northern Cyprus. Works as an Assistant Professor at Istanbul Bilgi University Department of Industrial Design.

**Aslı Kıyak İngin** Architect (M.A.), designer, and instructor at İstanbul Bilgi University Department of Industrial Design. Running critical, social, participatory and sustainable design practices as part of urban context. Founder of Made in Şişhane Project which aims to safeguard craft neighbourhoods through design. Her educational projects are Informal Academy and Masterpiece of Beyoğlu. She tutored at University of Thessaly Post Industrial Design Master Program.