Sustainable Schoolyards as Learning Landscapes

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Abstract

Learning for sustainability encourages informal learning, embeds daily usages and observations into the learning process, and has the potential to cultivate ecological-based habits for a sustainable future. We cannot separate the learning process and everyday life from each other. Therefore, the present research focuses on sustainable learning programs and designs in schoolyards within the framework of "learning landscapes," which is an emerging topic that requires interdisciplinary approaches. This article aims to combine curriculum design, spatial design, informal learning, and ecological design themes and explain the practice-based processes in "Design Your Schoolyard" workshops. This participatory and hands-on project involves multiple stakeholders and unfolds this multilayered structure within its process. Nature-child connections are insufficient in most cities, and the cultivation of sustainable practices only happens with nature and the practicing of sustainable behaviors in daily life. Therefore, school gardens are emerging with a new approach that interprets these areas as learning landscapes, not just as spatial designs but as an approach that creates connections with the curriculum and ecology to help children learn about sustainability and builds bonds between nature and children in daily life.

This study aims to launch a new discussion about schoolyard designs that support children in learning about sustainability and to highlight the principles of these learning landscapes. Secondly, the research offers various suggestions about handling these sites, the importance of the design of multi-stakeholder processes, and the inclusion of various disciplines into the process from a participatory and experiential project experience.

INTRODUCTION

The question of what kind of city we want cannot be divorced from the question of what kind of people we want to be, what kinds of social relations we seek, what relations to nature we cherish, what style of life we desire, or what aesthetic values we hold. (Harvey, 2012)

Spatial constructs have the potential to transform the habits of inhabitants' social consciousness and strengthen their connections with the environment. For sustainable and livable cities, ecological awareness is of significant importance starting from the individual scale. In parallel with this, the main aim of the present study is the transformation and cultivation of the habits of individuals who are moving away from nature and sustainable practices, particular in urban areas, by strengthening their connections with the environment and raising their ecological awareness.

The industrial revolution and the urbanization that accompanied it, and the related ways of life and thought, are all crucial in terms of disrupting nature-human relationships. Anthropocentric living practices dominate nature and the environment in today's cities. This view also reflects eco-dominant urbanization processes. There is an urgent need for a paradigm change in design processes to establish a connection with nature. The connection created during childhood by everyday life experiences and encounters with nature is of critical value, as are the bonds established with nature in childhood.

Based on the human-nature-space relationship, in line with the view that the transformation of human ecological consciousness and its relationship with the environment will bring about positive behavioral changes on many scales with systemic acceleration, this study was undertaken to pursue informal learning processes and methods in schoolyards as learning landscapes regarding sustainability.

Issues such as energy, climate change, scarcity, and environmental problems have become increasingly important and new solutions need to be found. The systems approach can have significant potential in creating solutions to these problems, which are not singular or stand-alone problems. Rather, they are all interrelated and should be addressed with a relational, holistic, systemic approach rather than singular solutions. In parallel with this view, children need to be introduced to sustainable practices and learn about the systemic relations through which we are connected on various scales to nature and our environments. Latour (1991) uses the term *bricolage* to emphasize the holistic and systemic link between the human and non-human (such as nature or technology) in the system and the necessity of considering it all together. De Certeau (1984) reinterprets the concept of bricolage, which was first used by the French anthropologist Claude Lévi-Strauss, and refers to it to describe how people perform everyday mundane activities such as speaking, reading, and cooking. In this way, people can make countless tiny transformations and adapt themselves

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to the dominant cultural economy (p. 18). In other words, *creative tactics* are defined as bricolage.

Therefore, everyday life is crucial in terms of transforming the habits and behaviors of people. Throughout this study, schoolyards are interpreted as learning landscapes where the everyday lives of children and many different interactions happen. This study aims to cultivate sustainable practices in students' daily lives. With such learning landscapes, students can be exposed to sustainable practices and learn how to use knowledge such as composting, recycling, or planting by experiencing these things in their gardens and seeing how they can apply the knowledge they gain in their daily lives as habits.

Design practices must integrate these concepts and ideas into the spatial design of such areas in cooperation with other disciplines. Therefore, this study focuses on education for sustainability in schoolyards as learning landscapes and interprets learning landscapes as pedagogical sites. New lenses are applied to blend pedagogy, outdoor learning, learning for sustainability, and curriculum designs in schoolyards.

Learning landscape is a concept that is becoming important. This concept is related to informal and Place-Based learning styles, where the learning is experienced with the help of the place, spatial design, and hidden curriculum that is embedded in the site. In these spaces, outdoor learning happens by experiencing the qualities of the place. Nowadays, edible gardens, green schools, and sustainable schoolyards have become crucial, and learning about sustainability started to be placed in schoolyards. Examples are shared in this paper. This study handles and interprets learning landscapes with schoolyard design, informal and Place-Based learning approaches, curriculum, and sustainability. First, therefore, it has an important on combining various disciplines. Secondly, studies in literature usually consider these spaces theoretically. But this research traces the literature and unfolds a practical-based process. Thus, it has importance in its theoretical and practical-based context and approach.

METHODOLOGY

This study highlights the importance of learning landscapes and the approach to developing and designing these sites with interdisciplinary approaches. Furthermore, it unfolds a participatory and practice-based workshop process that highlights learning about sustainability in schoolyards as learning landscapes.

Learning landscapes should be considered as bricolage with all parts of the system, such as nature, ecosystems, buildings, the internet, and technology as non-human factors. Throughout this study, informal learning, learning about sustainability, and learning about landscape design are examined and discussed relationally.

While learning landscapes are examined, as the first limitation, the research area is limited to school gardens. Another limitation was

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determined for learning about sustainability, with the study focusing on how learning about sustainability occurs in schoolyards.

During a practice-based pilot project that spanned approximately six months, online meetings were held with sixth- and seventh-grade students from Antalya Muratpaşa Dumlupınar Middle School. The researcher developed a curriculum blending sustainable design and environmental design and supported the students in creating projects after each session. All weekly meetings were supported by design projects and the students learned about recycling, composting, permaculture design, and various sustainability issues by creating projects and designs related to those topics. This curriculum was developed for the ages and developmental stages of the students and the online workshops were held during lockdowns for the COVID-19 pandemic. Table 3 in the following section explains the content and process of the pilot project. The online workshops prepared students to think about and discuss sustainable ideas and environmental problems, to define the main problems of their schoolyard, and to create sustainable solutions for school gardens.

The students designed their school garden in parallel with the workshops on sustainability and implemented the ideas that they produced in a participatory and experiential process with the support of the Istanbul Technical University Housing UYGAR Research Center and students from Antalya Bilim University's Department of Architecture.

Human change is not a sudden process, but by experimenting, interacting, learning, and sharing in different creative ways human behaviors may change and be cultivated. Learning landscapes and learning about sustainability require interdisciplinary and inter-relational system connections and perspectives. Therefore, curriculum design, informal learning, space, and ecology should be interpreted holistically and interactively. An urgent transformation is needed in schoolyards to interpret these learning spaces as a blend of curriculum, space, and ecological design laboratories. With that approach, this study undertakes a review of the literature by first considering informal learning and its relationship with place and curriculum, then reviewing works on learning about sustainability, and finally discussing learning landscapes and connecting all of this with the pilot study.

INFORMAL LEARNING: THE LINK BETWEEN SPATIAL DESIGN AND CURRICULUM

Informal learning is the experience and knowledge that can be gained at home, from friends, while traveling, and from newspapers and books or media platforms, which spreads throughout life and consists of knowledge, abilities, and perspectives gained in daily life. This type of knowledge is generally not organized or systematically disseminated; it is knowledge that a person gains in life (Coombs and Ahmed, 1974:8).

Learning processes take place in out-of-school environments informally together with the formal processes that take place in school. Formal learning is a planned and systematic process that occurs within a specific institutional

educational structure. Informal learning, on the other hand, involves random and spontaneous processes that permeate life.

Cities are becoming increasingly urbanized; therefore, the built environment is losing its green areas. Experiences of encountering, connecting with, and exploring nature in cities are disappearing. In this sense, school gardens as laboratories can become bases for learning in daily life and can facilitate experiential learning about sustainability. The potential of such places for teaching through experience is excellent. Therefore, schoolyards should be treated as three-dimensional and experiential maps or books and hidden curricula should be embedded in them by design practices.

The spatial design dimension of pedagogically based program studies is lacking. The present study discusses pedagogy, design, and ecology inter-relationally within the framework of "learning landscapes" with an interdisciplinary and holistic approach following the systems approach.

"An effective environmental education requires students to leave the classrooms" (Sobel, 2014:11). As cities become denser and more urbanized, children's mobility and access to informal play may decrease because of increased traffic, dangerous intersections, and parental fears (Freeman and Tranter, 2011). "Studies show that when urban children on different continents are told about the Amazon jungle or similar global ecological issues, children become desensitized" (Sobel, 2014:15). Children who cannot connect with environmental problems and phenomena may grow up as individuals who reject and ignore such problems. At this point, place-based education, the explaining of these phenomena and problems with examples from the immediate environment, and the development of practices that allow children to establish bonds by experimenting are all essential. Children can experience and learn about sustainability in learning landscapes in their daily lives in schoolyards and can learn to adopt sustainable practices and apply that knowledge in their lives. Harvesting rainwater from the roof against the danger of drought, learning about carbon footprints by recycling, and practicing planting in schools provide opportunities for children to connect with nature and environmental phenomena. The importance of learning in life by experimenting, observing, and discovering is an issue that needs to be underlined, and learning spaces should be designed considering these processes.

"As the subject of learning ecosystems is researched, we notice that place-based education stands right in the middle of formal, informal, and non-formal education as the philosophical binder of all possible learning experiences… Place-based education can take many forms, from informal to formal learning, from individual/family out-of-school experiences to teacher-led or school-sponsored activities, and from a course/project/unit/coursework to a fully designed school. Place-based education is a learning strategy that educators can apply in urban, rural, and suburban areas, and the possibilities are truly endless" (Ark and Schneider, 2016:7). In place-based and practice-based learning processes, the place and the relationship that the place will have with the curriculum are vital. This study and the related workshops were undertaken with the aim of creating bonds among place, spatial design, sustainability, and curriculum. When the principles of place-based learning are summarized, many stand out, such as communication, observation, research, relations with the environment, learner orientation, interdisciplinary approaches, and flexible environments with play, experience, and exploration (Getting Smart).

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In Figure 1, a learning pyramid highlights the importance of environment, interaction, and experience. Learning and how it happens should be interpreted by engaging in this process with informal learning practices. The learning pyramid below shows the ways of learning.
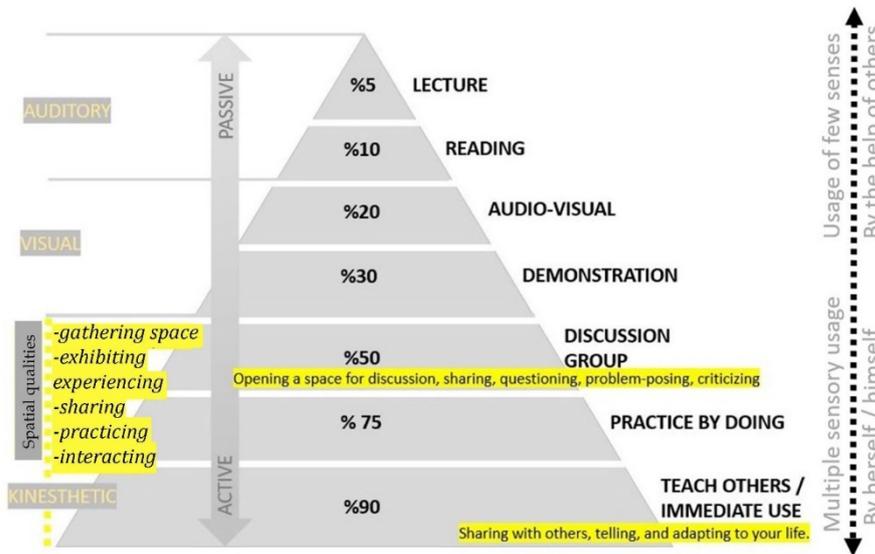
The learning process has a strong relationship with participation levels. Figure 1 explains that spatial gatherings, dialogue, practice-based projects, communication, adapting knowledge to life, and sharing/explaining knowledge with others significantly affect the learning process. In this sense, processes of learning about environmental education and sustainability gain importance in terms of re-establishing the child-nature relationship with participatory and practice-based learning processes.

In parallel with its definition by many other authors and researchers, environmental education includes processes such as fostering active participation in environmental issues, environmental protection, sustainable development, bonding with nature, taking environmental responsibility, and raising environmental awareness by establishing cause-and-effect relationships. It is the whole of various processes that aim to strengthen human-environment and child-nature relations and to ensure participation in design solutions for learning spaces (Ağyar, 2014; Nagel, 2005; Demirkaya, 2006). While children participate in design ideas for learning spaces, they interact with the place and each other, which may lead them to active learning processes, as well. The student's level of participation is at the highest level while establishing relationships with the place and nature and during learning processes. Hart (1997:41) describes children's degree of participation according to various levels. At the lower levels, we notice that there is no participation and children are not included in the decisions or planning processes. At the upper levels, participation increases. Children are informed and consulted, and they have space to express their ideas, necessities, and priorities. They also take responsibility in decision processes.

Play is another crucial act that supports creative and informal learning. Louv (2010) states that in Europe after the Second World War, a playground designer examined children playing on asphalt and concrete playgrounds and discovered that children preferred to play with soil and timber from war debris. Children have instincts of playing and learning naturally; they play and learn in daily life, discover, observe, make, break, and re-make, and through

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these playful and observatory processes, they bond with natural materials or with natural landscapes. In short, they play and learn.

Hewitt (2016) states that children do not only need classrooms to learn. They can also learn in the field in their daily lives; for example, while planting seeds they can learn geometry and mathematics. This concept is becoming more and more widespread in Europe and the United States; children can play in the mud, build castles, play on swings made of car tires, light campfires, or cook outdoors, learning about astronomy, gardening, and nature in the process. Louv (2010) states that such programs and spaces allow children to experience natural elements directly.

"Learning…is the process of creating knowledge by transforming experience" (Kolb, 1984:38). Experiential learning, as put forward by Kolb, is parallel to informal learning in this sense and it establishes a strong connection with place-based learning methods. Jacobs (1999:51) defines *experiential learning* as a process in which the learner produces knowledge, skills, and values from direct experience. Learning by doing is also included in this process. In the process of approaching schoolyards as learning landscapes and designing them for learning about sustainability, informal learning methods have an essential place and establish links between the place and curricula.

As Sobel (2014) underlines, children should learn by playing games and teaching each other through informal processes. The practice-based part of this study used these informal learning methods and applied them to the structure of the workshops. Participation, playful learning, experiencing, and interactions were the focus during the design and development of the workshop studies.

LEARNING ABOUT SUSTAINABILITY AND CHILDREN-NATURE CONNECTION

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Children need nature for the healthy development of their senses, as well as for learning and developing their creativity (Louv, 2010:67). However, when children grow up in cities, gradually disconnecting from nature, they forget their knowledge of nature as they become adults. Providing space for children to communicate with their environments naturally and experientially through bonding should be one of the primary goals of urban design.

"Education for sustainability develops the knowledge, skills, values, and world-views necessary for people to act, in ways that contribute to more sustainable patterns of living. Sustainability education is futures-oriented, focusing on protecting environments and creating a more ecologically and socially just world through informed action. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural, and economic systems and their interdependence" (Australian Curriculum).

"For the new generation, nature is more of an abstraction than a reality. Day by day, nature becomes something to be watched, consumed, dressed, and even ignored" (Louv, 2010:3). We have recently become acquainted with the concept of ecophobia. "City residents with small children in their immediate vicinity will notice immediately that these children do not have any connection with nature if they look carefully. This rupture loses its rationality from time to time…like children who are afraid of black flies or children who refuse to pluck fruit from their branches and refuse to eat them" (Sobel, 2014:14). Ecology should not be a phobia for the child; it should be perceived as a source of enjoyment and even a playground.

Environmental-based education, which is known by various names, is an idea that is at least a century old (Louv, 2010:243). As mentioned, environmental education covers many different practices and methods. Activities such as observation in ecological areas, trips to botanical gardens, garbage collection activities with active participation, bird watching in parallel with nature education, and underwater ecosystem observations in wetlands are included in environmental education. Figure 2 explains the spaces where learning can happen outside the classrooms. Also figure explains the spatial necessities and criteria of those spaces.
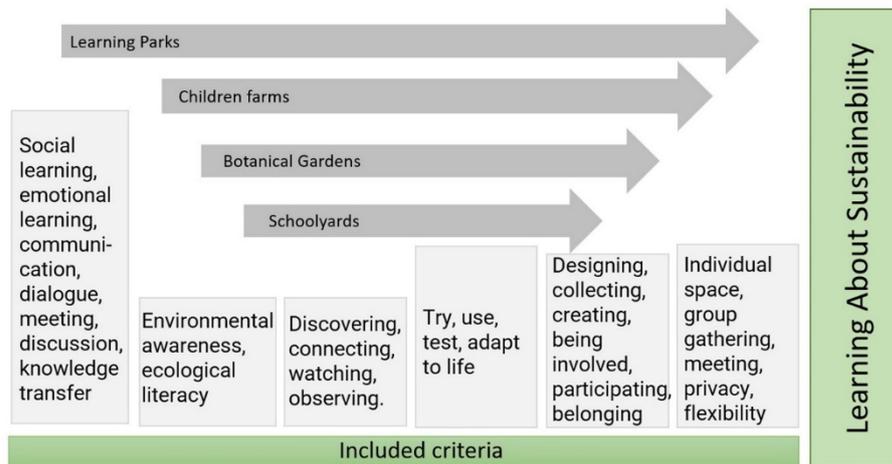

Figure 2. Informal learning about Sustainability in various spaces and their spatial necessities. Source: Developed by the author.

Learning about sustainability can happen outside the classrooms with an informal learning process. Figure 2 unfolds how learning can happen in these informal learning spaces.

In the Educating for a Sustainable Future program, UNESCO underlines the vital link between environmental education and sustainable development and explains how to develop skills, attitudes, values, and understanding by avoiding a focus on passive information within the framework of "Education for Sustainable Development." There are strong links between sustainable development and environmental education. In general, it can be said that education programs in Turkey do not include sufficient subjects or facilitate appropriate student acquisition of "education for sustainability." Therefore, considering the current and future trends, it is necessary to change or organize programs in line with these principles so that future teachers and students can receive environmental education considering these transformations. Another issue is providing the appropriate time, place, and activities to achieve these objectives because environmental-based experiences are not passive gains that can be realized without practice-based applications, and their results cannot be observed quickly. Schools should apply holistic environmental education and organize themselves according to environmental education. Environmentally based studies should be increased in terms of quality and quantity with different environmental organizations or voluntary organizations" (Tanriverdi, 2009:102)

In this sense, it is essential to consider school gardens holistically. Therefore, environmental education programs need to be planned together with school administrators, students, and teachers with the spatial dimension, developing interdisciplinary approaches for this multi-stakeholder process and disseminating ideas at the intersection of education, sustainability, and spatial design. Throughout the practice-based process of this research, multiple

stakeholders were included in participatory processes. The stakeholder and pilot project process relations will be explained in the following section.

LEARNING LANDSCAPES

The environment is a "silent curriculum" that can provide positive or negative learning experiences. Solutions for the interpretation and design of learning landscapes lie in seeing the physical environment and the quality of the environment as active and indispensable parts of the learning process (Taylor, 2008:25).

After the participatory workshop pilot studies, the main problems could be highlighted as a lack of understanding about learning landscapes. Spatial design and curriculum design are not separate topics. Learning processes, educational theories, and participatory processes should be included in the design process of learning landscapes. This is not only a design issue; design disciplines should also be interacting with educational studies, as well.

Learning landscapes are defined by Taylor (2008) as thoughtfully designed, attractive learning spaces that offer open spaces for mathematics, science, history, art, literature, and ecology. Griffith (2021:24) underlines the importance of space that allows for experience and discovery in the learning process. According to Griffith, children want to spend most of their time in places where learning and discovery are possible and welcome. In this sense, in the design and organization of learning spaces, it is necessary to consider the instinctive needs of children to explore and experience during their learning processes.

Fielding (2006) examines the best examples of learning environments and lists six crucial characteristics of the fields that provide education. These characteristics are:

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- Supporting teaching and learning.
- Maximizing physical comfort and well-being.
- Demonstrating environmental responsibility.
- Serving the community.
- Establishing design principles that make buildings work better, last longer, cost less to renovate and maintain, and inspire and adapt to changing needs.
- Applying open, transparent, and collaborative processes that allows the school and community assume ownership of planning and design.

In the pilot study, while designing and developing ideas for the schoolyard, these characteristics were blended and highlighted. To support learning in an outdoor space, an open classroom was designed in the garden. A transparent and participatory process was shared in the school environment. To demonstrate environmental responsibility, students were taught about sustainability, and they discussed and developed sustainable solutions for their gardens. These steps will be explained in the following section.

Lackney (2000), on the other hand, offers 33 principles related to learning areas in much more detail. Some of these principles that were used or provided inspiration during the pilot project of the present study are listed and explained in Table 1.

Table 1. Chosen and applied principles from Lackney's (2000) explanation of learning areas. Source: Developed by the author.

Principle used or inspirational during pilot studies	Explanation
Consider Home as a Template for School	During the sustainability workshops families were included and some projects were done with families. What students learned and practiced at school was shared at home and new behaviors were practiced at home.
Maximize Collaboration in School Planning and Design	The garden was developed for communal usage and usage details of the areas were explained, such as how to use the composting area or how to take care of planting areas shared via an open classroom wall.
Provide Space for Sharing Instructional Resources	An open classroom and community boards in the garden were used to share instructional resources such as how to water the garden or how to use the composting zone. This allowed students to learn, take responsibility, and take care of the garden together.
Provide Studios to Support Project-based Learning	Design applications provided open spaces for learning areas; for example, art lessons can be held there, and nature art installations or yarn bombing can be applied with a place-based learning style. Students can also learn mathematics and geometry by planting in the permaculture garden.
Establish a Community Forum	With the open class area, a communal area was established in the garden.
Establish a Variety of Outdoor Learning Environments	Various learning spaces related to sustainability were applied in the garden, such as a composting area, nature art stations, a permaculture garden, recycling stations, bug hotels, an herb garden, and a sensory path.
Separate Children and Pedestrians from Vehicles and Service	In the beginning the school garden was used as a parking zone and there was no boundary for the parking spots. Vehicles were separated from the garden and a sensory garden area was established just for students' usage.

Taylor (2008:326) mentions that learning landscapes should make room for various elements and defines these elements as follows:

- Natural elements: Climate, plants, animals, habitats, soils and rocks, sun and shade, water, hills/topography, wetlands, etc.
- Multi-sensory elements: Variety in textures, colors, patterns, sounds, tastes, and smells.
- Agricultural elements: crop garden, farms, orchards, irrigation systems, land management areas, animal shelters.
- Built elements: Play structures and equipment, exercise equipment, trails, beamed earth, steps, shade structures, sports fields, pavilions,

      gazebos, seating, storage, fencing, walls, flooring and graphics, signage, roof playgrounds.

- Outdoor classroom items: Weather stations, power stations (windmills, solar panels), sundials, amphitheaters, musical playgrounds of outdoor instruments, nature trails, sports tracks, solar greenhouses, water harvesting systems, science laboratories
- Cultural elements: Indigenous design, entryways, student art, public art, courtyards, plazas, gathering spaces for groups of different sizes, architectural styles, local materials, separate access for public use.
- Transition elements: Plants ways to bring the outside in and expand the learning environment, including patios, patios adjacent to classrooms, patios, sunrooms, patios, openable walls and windows, views, skylights, open courtyards, roof gardens/green roofs, vertical wall/ green walls, indoor landscaping, smart facades and new photovoltaic functions, transparency in design, the juxtaposition of formal and natural landscapes -terraced slopes, cascading drains, lily ponds in courtyard settings.

During the pilot study, these elements were included in the design process. A multisensory garden was developed and applied in the school garden with natural elements, and agricultural learning spaces and an outdoor classroom were also applied, creating relations between themselves. The aromatic garden was placed next to the bug hotel and the permaculture garden was placed next to the composting area, allowing these sustainable practices to support each other. In the following section, the details of the process will be explained.

Another approach to this topic has been made by the Children & Nature Network as part of the "Green Schools" movement. This organization defines learning spaces as "multi-functional spaces for play, learning, discovery, and development" (Children and Nature Network). Accordingly, learning landscapes establish a relationship between the interior and exterior environments of the school building, not only with spatial relationships but also with community engagement and by providing space for relations and interactions, encounters, and sharing. The organization also suggests ways to transform school gardens and make them healthier. Outside of school hours, learning landscapes can be used as public spaces, opening them to the use of neighborhoods and communities. Green school gardens should include outdoor classrooms, local and pollinated gardens, rainwater harvesting, traditional playground equipment, nature playgrounds, edible gardens, paths and walkways, trees, shrubs, and other planting elements as for the Children and Nature Network.

Takahashi (1999) states that if we adopt learning environments beyond a building, our vision of school and learning will expand. Thus, the garden, terraces, softscape and landscaping arrangements, terrace areas, pavilions, and gazebos will become parts of the school as spaces where the learning process takes place. One of the main issues to be considered in the design process of a learning environment is the need to move away from the idea that education takes place only inside buildings. In the building design, gaps and doors opening to the outside should be blurred and the relationship between indoor and outdoor space should be strengthened. Classrooms need instant action with arrangements that will establish relations with the outside (Takahashi, 1999). Therefore, the blurring of indoor-outdoor boundaries and the permeability of the building in learning landscapes should be ensured to

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establish outdoor learning programs in schoolyards. Figure 3 illustrates the spatial qualities of green schools that support outdoor learning with examples.

Figure 3. Examples of schoolyard designs as learning landscapes. Source: **(a).** Michael Reynolds Sustainable School in Uruguay. Apart from planting activities, softscapes are integrated into different usages. Indoor and outdoor borders are blurry and in relation. (Jewell, 2018). **(b).** Kirkkojärvi School in Helsinki, Finland. (Landezine, n.d.). **(c).** The lessons are held in a natural environment; the time spent is in nature in such a way as to establish a relationship with natural elements and materials. (Green School, n.d.). **(d).** A learning landscape example in the schoolyard that aims to connect different ecosystems and sustainable solutions and use them in daily life. Green school, Bali. (Nowbali, n.d.). **(e)** Lewis Elementary School, USA (Learning Landscapes, n.d.) **(f).** Volcan Ojos del Salado Kindergarten, Santiago. (Dejtiar, 2020).

For learning to take place outside the building and to transform gardens into learning landscapes, various experiential design applications can be applied in schoolyards. These include open-space classrooms; islets where different sizes of groups can work; applied areas such as laboratories where students can observe applications on agriculture, biodiversity, or renewable energy; areas such as poultry houses, crop areas, and other gardens; and areas for rainwater harvesting, all of which can be used as learning landscapes.

Principles and Elements of Learning Landscapes

In parallel with the literature review and the case studies mentioned above, the qualities and elements of learning landscapes may be listed as follows:

- Areas should be designed with natural materials such as water, sand, wood, stone, and bark so that children can touch, feel, explore, observe, and connect with nature.
- Learning landscapes should include space and materials for play and movement as determined by the child. They should also include elements that develop creativity, like open-ended, perishable, natural materials such as sand, stones, rocks, and logs.
- Spaces consisting of flexible and loose materials that contain bushes, twigs, and other materials from nature will give students opportunities to re-make and disrupt. Spaces should be open to development and events that allow for making, spoiling, and re-making rather than finished products. These spaces also provide opportunities for children to develop their imaginations.

- Habitat gardens, plant spirals, "hotels" to watch insects and reptiles, areas for observing biodiversity such as bird houses, and areas for natural habitats should be included.
- Planting areas and vegetable beds will help develop the responsibility, self-discipline, healthy eating habits, and ecological awareness of the students.
- Playful, rugged topographies and multisensory environments that develop kinesthetic and sensory abilities should be created.
- Various outdoor gathering, working, and observation places should be established. Such spaces allow interactions and create cascades of them. Individual, hidden niches and other alternatives will allow students to gather as groups or spend time individually connecting with nature.
- Eco-art and nature art spaces that emphasize recycling, nature watching, discovery, and observations can be designed for learning about nature and sustainability. Art classes can be applied in these processes.
- Students should be able to observe and utilize applications such as recycling, rainwater harvesting, and solar energy systems, applying them in daily life.
- An integrated spatial approach should be offered with fixed and moving landscape components in parallel with the physical, social, emotional, and cognitive development and needs of the children.
- Boundaries between the school building and the schoolyard should be dissolved with cooperation among the architectural design, landscape, pedagogy, and ecology. Boundaries between indoors and outdoors should be blurred, spreading the curriculum across the entire schoolyard.

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Table 2. Learning spaces and their qualities. Source: Prepared by the author.

Description of learning spaces	Source
Opening a space for discovery and experience.	(Griffith, 2021)
Carrying environmental responsibility and design criteria.	(Fielding, 2006)
Active, ready for the formation/birth of new events.	(Kwon, 2004)
Wild, exploratory.	(Louv, 2010)
People, practices, and places should be evaluated in their integrity, and the human-practice relationship as a social learning environment should be associated with experience and Place-Based learning.	(Malinin, 2017)
Extension of the interior.	(Şener, 2001)
On a neighborhood-scale, a community learning center, that allows sharing within the community.	(Lackney, 2000)
Establish a relationship between indoor and outdoor.	(Takahashi, 1999)

In parallel with this, learning landscapes can be evaluated according to the descriptions of learning space design. Instead of ending with finished products and materials, they should be approached as active and interactive spaces that are open to development, formation, decomposition, and reconstruction at any time.

Schools carry, reflect, and produce the culture, habits, shared values, and social behaviors of the places where they are located. They also produce new values and principles with their implicit and explicit curricula. In this sense, many countries consider the relationship between education and design as an essential issue and adopt holistic, interdisciplinary approaches in these institutions' designs and programs for raising future individuals. As designers, we need to re-think this current and critical issue of how school campuses can become learning tools.

"It is known that individuals spend time with artificial materials in closed areas since their early childhood, due to reasons such as technology, urbanization, or lack of time. With the increase in the time spent indoors, the contact of people with nature has begun to decrease gradually" (Ataş, 2021:426). On the other hand, nature's contribution to children's social and emotional learning and development is a vital subject that is often discussed (Chawla, 2007; Louv, 2010; Sobel, 2014; Göl-Güven, 2021). Children's needs for exploring, moving, and playing are present in natural environments, and, in parallel with this, it is worrying to see children moving away from nature (Louv, 2010). As Ataş (2021) reports, children's experiences in nature have decreased significantly, the culture of children accustomed to playing outside is gradually disappearing, and most of their daily lives are spent indoors. As mentioned above, school gardens are of great importance in sustainability, establishing children's relationships, and creating informal learning processes.

A PRACTICE-BASED PILOT STUDY: "DESIGN YOUR SCHOOLYARD" WORKSHOPS

This study emphasizes the potential of school gardens in the learning process within the framework of "learning landscapes" and considers these environments as active learning spaces.

The "Design Your Schoolyard" workshops offered an experiential, hands-on, participatory process that united multiple stakeholders. Throughout this practice-based research and pilot study, the researcher collaborated with sixth- and seventh-grade students from Antalya Muratpaşa Dumlupınar Middle School. Online workshops focusing on sustainability education were carried out for six months. With the help of these workshops, the students developed sustainable design solutions for their schoolyard. Online programs, drawings, and models were used in this creative process. At the end of the online workshops, within a democratic atmosphere, suitable projects and ideas were selected for application. Later, with the support of the Istanbul Technical University Housing UYGAR Research Center, these ideas were applied. In the final step, students from Antalya Bilim University's Department of Architecture joined the process and applied the sustainable ideas together with the middle school students within the themes of social architecture, children's participation, and sustainable design.

This practice-based study underlines that learning by experience, discovery, participation, and taking responsibility has an important place in the process of learning about sustainability.

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Ataş (2021) describes the relationships among school, home, and society as "areas of support" for closeness to nature and states that children's close relationships with nature are supported by this trio. Additionally, learning landscapes, as ecological learning-based designed spaces, have important value in terms of closeness to nature and sustainable practices. New stakeholders can be added to the trio, such as partnerships with NGOs, permaculture designers, universities, architectural planning and landscape design students, social architecture clubs, researchers, and other multi-stakeholder collaborations. Strong collaborations can be created by school and public administrators. In addition, environmental education and space design should be brought together with school administrators, students, and teachers from a holistic perspective.

These connections and collaborations also strengthen participation. This practice-based study was designed to include multiple-stakeholder collaborations in its processes. The diagram in Figure 4 integrates and expresses the roles of stakeholders in the processes of the pilot study.
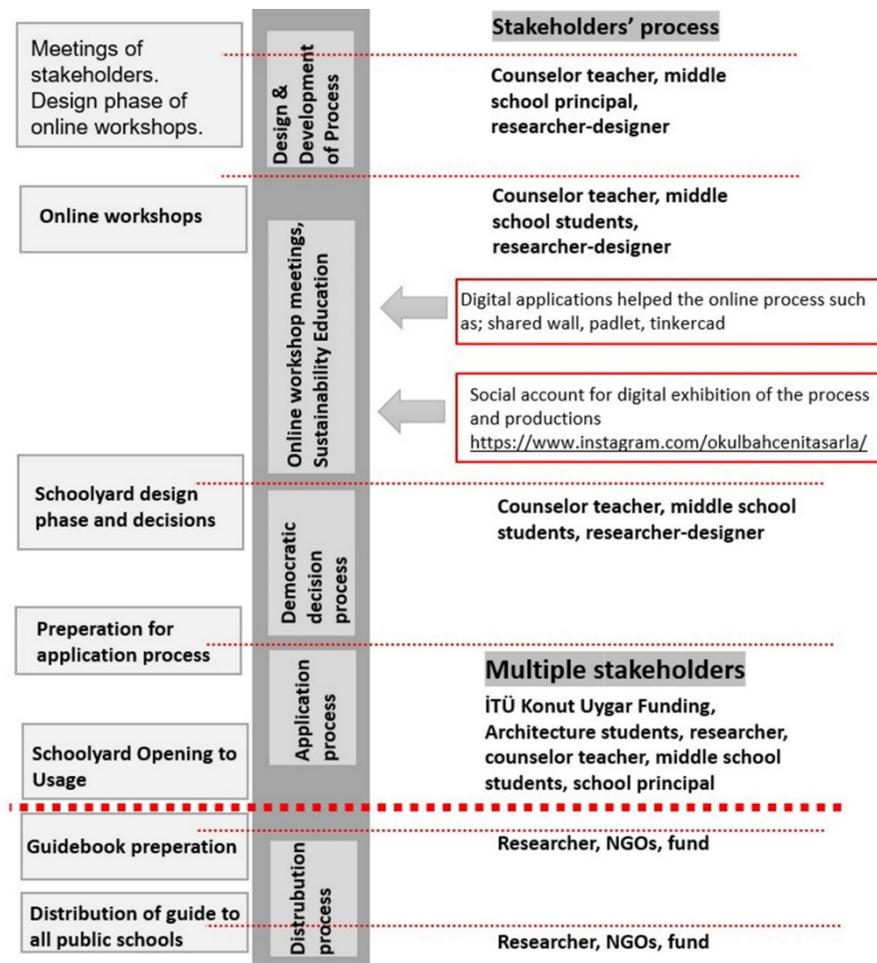

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Figure 4. "Design Your Schoolyard" process and the stakeholders. Source: Prepared by the author.

Issues such as education for sustainability, landscape design, schoolyard design, and curriculum design cannot be interpreted separately; they involve interrelated stakeholders and operational processes. Therefore, they should be analyzed and applied with multidisciplinary approaches.

The "Design Your Schoolyard" online workshops started in January 2021 and ended with a participatory and experiential application project in June 2021. Over the course of six months, weekly online meetings focused on

education about sustainability. Table 3 presents the main topics of the workshop.

Table 3. Curriculum: Online and face-to face workshop topics and the process. Source: Prepared by the author.

January-March 2021	ONLINE WORKSHOPS	The problems of our cities, neighborhoods, and our solutions.	Model making, sketches, digital works
		What is sustainability? Environment and Ecology. Sustainable cities. Sustainable Transportation.	
		Recycle, Reuse. Our carbon footprint.	
		Compost application examples. Making our own compost at home.	
		Healthy Eating, Agriculture in the City, Food. Community Gardens, Crop gardens. DESIGN YOUR SUSTAINABLE NEIGHBORHOOD.	
		Permaculture principles, sister plants.	
		Energy, Water, Waste, renewable systems.	
		Design your sustainable home.	
		Plant and Animal Diversity, biodiversity. Insect, bee hotels. ecosystems.	
		Basic Design, Eco-art and re-use.	
		Mind maps. Garden maps. Schoolyard discussions.	
April 2021		Design your schoolyard with sustainable principles.	
May 2021 Decision and Discussion		Self-criticism, discussion, taking decision as a group. Deciding on the projects to apply to garden. -Design of application process. Decision of materials. Meeting with architecture students.	
June-July 2021	Schoolyard	APPLICATION PROCESS (Sharing the process with online social media page.) -Material selection and procurement. - Organization and orientation of students, distribution of tasks. -Application and design on site as well.	

During the process of designing the schoolyard, the students chose a dead space, namely the backyard of the school that was being used as a parking lot and developed ideas for that area.

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Figure 5. Activity and usage analysis of the pilot project. (a). Before the design application. (b). After the design application. Source: Prepared by the author.
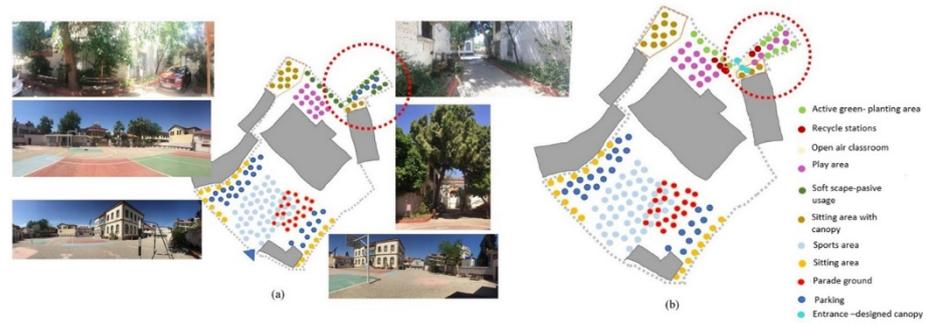
Figure 5a shows the original usages of the front and back parts of the garden with photos of the site. As is seen, usages were limited by the parking lot. Figure 5b illustrates the additional usages with a new usage diagram of the garden. The following conceptual diagrams explain the functional relations of the yard before and after the implementation.
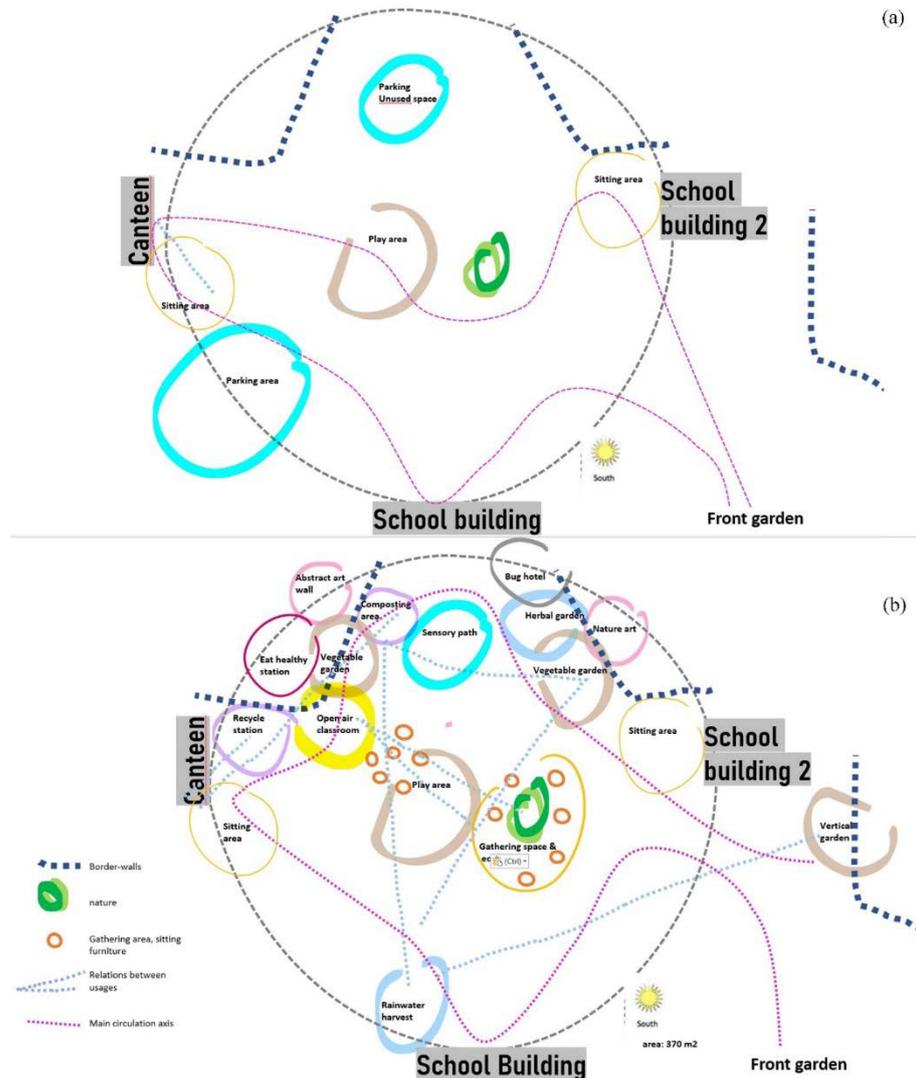
Figure 6. Conceptual diagram of functional relations in the pilot project area. (a). Before the implementation. (b). After the implementation. Source: Prepared by the author.

As seen in Figure 6a, there was previously no daily usage or activity in the backyard. The area was used as a parking lot, but the students noticed some potential there and wanted to apply design ideas to this space. Figure 6b explains the usage of the site after the application. It also shows the relations

between the design ideas and usages and the main circulation axis spread into all parts of the yard.
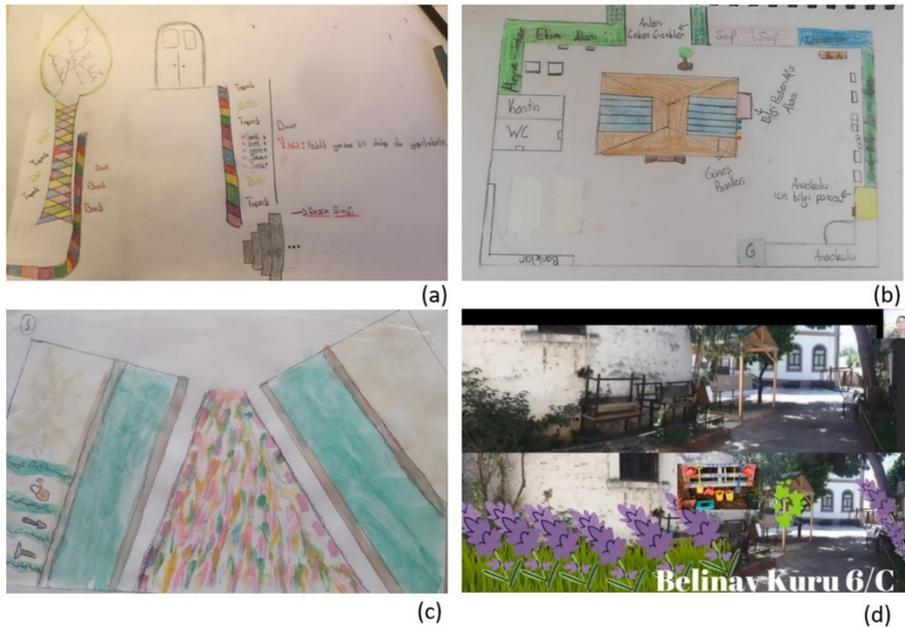

Figure 7. Student sketches and representations during online workshops for the design of the schoolyard. (a). Student sketch on eco-art and permaculture design of vegetable garden. (Student: Belinay Dikmen). (b). Student work for the schoolyard as a plan. (Student: Melisa Çağala). (c). Student sketch expresses the planting area, eco-art, sensory path ideas. (Student: Naz Belinay Kahraman). (d). Student digital work expressing aromatic garden and organization of the backyard during the online workshops. (Student: Belinay Kuru) Source: Prepared by the author.

The middle school students developed ideas for their schoolyard following the sustainability principles to which they were introduced during the online workshops.

During the application process, architecture department students worked with them, as well.

Figure 8. Design applications to the site. Source: Prepared by the author from the process, photos taken by Beste Sabır Onat.

Their ideas came to life in the schoolyard. A bug hotel, aromatic herb garden, vegetable garden with permaculture principles, healthy eating station, information boards, canopy over the garden's entrance, vertical garden, sensory path, open-air classroom, recycling stations, composting area, rainwater harvesting station, and eco-art and yarn bombing projects were applied to the site.

Figure 8. Participatory process of "Design Your Schoolyard" pilot project. Source: Prepared by the author from the process, photos taken by Beste Sabır Onat.

In Figure 9, photos expose the application process of workshop. Students applied their designs to the schoolyard. In the first line (from left to right): First photo shows the application of composting bin, second photo shows the application process of yarn bombing to the tree, the students wanted to gather under this tree, third photo shows the supplication of permaculture garden. Students learnt the permaculture criterions and planted the vegetables through permaculture rules.

In the second line: first photo shows the application of sensory path. Second photo shows the application of vertical garden, and third photo shows the discussion process before the application of planting areas.

In the third line, first photo shows the application of aromatic garden next to the bug hotel, second photo shows the canopy area in the entrance of sensory garden, third photo shows the preparation of the art wall.

In the fourth line, first photo shows the preparation of open classrooms black board, second photo shows the materials of sensory path, and the third photo shows the sensory garden after the workshops.

DISCUSSION, EVALUATION AND RESULT

Learning is a double-sided process; while the environment shapes the child, the child can also participate and shape the environment to strengthen the learning process.

This study has focused on learning landscapes and learning about sustainability in schoolyards. Informal learning processes were presented to incorporate learning about sustainability in the everyday lives of students as an outdoor learning and practice-based process.

This study has addressed how to transform schoolyards into learning landscapes. During the practice-based part of the research, the study first aimed to strengthen students' knowledge of sustainability with online workshops, to secondly support students and involve them in developing ideas for their schoolyard, and to thirdly support them in applying their ideas in the schoolyard via a participatory process.

This experience-based study has sought to launch a new discussion about learning landscapes while blending this issue with sustainability and hopefully opening a new debate on this emerging area where spatial design can meet educational theories, ecology, sustainability, and curriculum design.

There is an urgent need to organize and design school gardens with new lenses, focusing on ecological solutions and interdisciplinary approaches that blend sustainability, design, and learning theories with curriculum design. Research asserts that schoolyards are vital spaces for children to come into contact with nature, cultivate sustainable practices, and grow to become active citizens. The design methodology of learning landscapes is an emerging area and should be interpreted with multifaceted approaches that include curriculum, pedagogy, ecology, and environmental education.

During the participatory and practice-based processes of the workshops, the themes and key lessons listed in Table 4 emerged.

Table 4. Lessons Learned from "Design Your Schoolyard" Online Workshop Process

Themes of Online Workshop & Application Process:	Key Lessons:
Education for sustainability online workshops	Workshops helped students learn about sustainability principles and practices and supported them while designing the schoolyard and learning about sustainability; it was also a supportive and empowering process during the COVID-19 pandemic
Making shared decisions about the garden with online discussions	Democratic processes allowed students to listen and learn from each other and make decisions together as a step of the participatory process

Application of ideas/designs together with university students as a participatory process	Students supported and helped each other while applying design ideas such as bug hotel, sensory path, canopy, etc.; they formed and developed new ideas together at the site and shared knowledge while planning, planting, and cleaning the garden
Shared goals	Planning a green schoolyard with sustainable ideas and applying these designs strengthened feelings of belonging to the school, the community feeling in school, participatory processes, and learning from each other
Starting a "sustainability club"	The idea of the club strengthened students' sense of belonging to the school, owning the ideas that they produced and chose together, respecting each other's ideas, spreading knowledge, teaching each other, and learning from the place and each other, and distributing the work and taking responsibility in the garden
Shared learning	All participants and stakeholders of the process learned from each other; for example, schoolteachers and the principal learned from the practice-based project while university students and middle school students learned from each other, and the online process helped build knowledge, collaboration, and inclusivity for students to get involved and develop more ideas together
Integration of families	Families were involved in sustainable practices and the learning process; students passed knowledge and practices on to their families and started to apply sustainable practices such as composting, recycling, and reusing waste products at home

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Planning and design disciplines should address crucial processes such as the design of collaborations and partnerships and creating stakeholder relations for dialogue, such as planner-educator-student collaborations, student-student collaborations, and application-curriculum-student relationships.

On the other hand, as the environment and space design meet their users, they can also transform, change, and direct their behaviors towards ecologically based practices. In this sense, some processes need to be designed and re-developed with interdisciplinary approaches, from the materials to be selected to the learning processes integrated into the site design and curriculum. These processes cannot happen without the cooperation of multiple actors.

Schoolyards need to be interpreted as ecological and social transformers of schools. As the ecological transformation begins at home, on an individual level, the school has a crucial role in cultivating sustainable practices. Therefore, schoolyards as learning landscapes need urgent and innovative approaches and design processes that include multiple stakeholders and dialogues.

This pilot study unfolded the participatory, Place-Based structure of these sites. Schoolyards as learning landscapes need to be interpreted and discussed

with different disciplines together with a holistic approach. On the national scale, urgent regulation is needed to blend curricula and learning with outdoor environments. Students should be included in the design and organization of these learning landscapes. Architects and spatial designers should start developing not only physical designs but also context and curricula for these sites.

ACKNOWLEDGEMENTS/NOTES

Through this link more images and videos can be found:
https://www.instagram.com/okulbahcenitasarla/

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Resume

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