

Research on Outdoor Classroom Design in School Gardens

Elif ŞATIROĞLU¹ , Selda AL ŞENSOY² , Abdullah Yasin DÜNDAR^{3*} 

ORCID 1: 0000-0002-3891-3927

ORCID 2: 0000-0001-8459-7032

ORCID 3: 0000-0002-5333-1618

¹ Recep Tayyip Erdoğan University, Faculty of Engineering and Architecture, Department of Landscape Architecture, 53100, Rize, Türkiye.

² Karadeniz Technical University, Faculty of Architecture, Department of Architecture, 61080, Trabzon, Türkiye.

³ Delft Technical University, Faculty of Architecture and Built Environment, Department of Architecture, 2628, Delft, Netherlands.

* e-mail: a.y.dundar@tudelft.nl

Abstract

Outdoor classrooms, one of the oldest educational approaches that have existed, bringing learning through the common denominator with nature to the agenda, first emerged in England as a reform movement in education at the end of the 1950s. Outdoor classrooms are a rare educational structure that allows students to interact with nature and experience the opportunities of this interaction with their fully digitalised interaction potentials. In the study, examples of open-air classrooms, which are almost non-existent in Türkiye, have been analysed with inductive content analysis by understanding them with the semi-structured interview technique conducted with architects and landscape architects who are teachers and practitioners. In the end, considering all the evaluations, it was determined that the effects of outdoor classes on students were grouped into four categories: effects on cognitive, psychomotor, development, affective, and social development. Beyond only using a theoretical approach, exemplary outdoor classroom models were developed and interpreted.

Keywords: Outdoor classroom, spatial education, classroom design, school garden.

Okul Bahçelerinde Açık Hava Sınıfı Tasarımı Üzerine Bir Araştırma

Öz

Tarihsel anlamda en eski eğitim yaklaşımlarından biri olan, doğa ile ortak payda üzerinden öğrenmenin yeniden gündeme gelmesini sağlayan açık hava sınıfları, 1950'li yılların sonundan itibaren, eğitimde bir reform hareketi olarak ilk önce İngiltere'de ortaya çıkmıştır. Daha sonraları Amerika'da da uygulamaları görülen açık hava sınıfları, günümüzde tam anlamıyla dijitalleşen etkileşim ve iletişim potansiyelleri ile, öğrencilerin doğa ile etkileşime geçmesine ve bu etkileşimin fırsatlarını deneyimlemesine imkân veren nadir eğitim yapılarından biridir. Çalışmada, Türkiye'de örneklerine yok denilecek kadar az rastlanan açık hava sınıfları, öğretmenler, mimar ve peyzaj mimarları ile gerçekleştirilen yarı yapılandırılmış görüşme tekniği ile anlamlandırılarak, tümevarımcı içerik analizi ile çözümlenmeye çalışılmıştır. Çalışmanın sonunda, tüm değerlendirmeler ışığında, açık hava sınıflarının öğrenci üzerindeki etkilerinin genel olarak dört grupta toplandığı saptanmıştır. Bunlar; bilişsel, devinimsel, gelişime etkisi, duyuşsal ve sosyal gelişime yönelik etkileridir. Sadece kuramsal bir yaklaşım ile ele almanın ötesinde, örnek açık hava sınıfı modelleri geliştirilerek yorumlanmıştır.

Anahtar kelimeler: Açık hava sınıfı, mekansal eğitim, sınıf tasarımı, okul bahçesi.

Citation: Şatiroğlu, E., Al Şensoy, S. & Dündar, A. Y. (2023). Research on outdoor classroom design in school gardens. *Journal of Architectural Sciences and Applications*, 8 (2), 558-586.

DOI: <https://doi.org/10.30785/mbud.1335264>



1. Introduction

From the ancient Greek academy, one of the first educational environments of civilisation, to the madrasahs in the medieval Islamic states, education in all different cultures has been based on following an integrated attitude with nature, which is the first teacher. Observing nature closely, reasoning about it, learning through direct interaction, and thus putting forward theories based on practice are some essential activities. However, this egalitarian attitude begins to change towards a high-level approach imposed by man, with the strict discipline of Scholastic Christian thought and the effort to understand the world by drawing the precise boundaries of modern moral methods. After this point, the world is tried to be grasped through the direct execution of the sterilely imposed teachings. Information that is introverted and begins to be memorised with the sharp order of its rigid orders can be seen as the result of the mind reaching to be understood as the only and most perfect way to understand the world on its own. The tools that must maintain the same order are used in classrooms and educational structures, which are the spatial manifestations of this educational dynamic that emerges in social life.

One of the main reasons why the teacher-centred and one-way transfer of knowledge is seen as the correct way is the break with nature. Defining the only way to access the world with the human mind and keeping it above all other elements caused the solidarity understanding between nature and humans to break. In this sense, Ecology philosopher Morton (2017) highlights that we should value other natural phenomena, such as light scattering, life cycle, friction, and thinking ability, which is only one way to access the world. According to the philosopher, we should focus on allowing this gap to exist and adopting a conciliatory attitude to this situation instead of covering the unbridgeable gap between nature and mind by preferring one over the other. It can be foreseen that open-air classrooms, close to this understanding, aim to create a multifaceted learning atmosphere where the student is at the centre, open to exploration and external stimuli.

Many researchers have discussed nature's positive contributions to the child's development. As a result of the studies, it has been determined that nature increases the feelings of self-discipline and self-confidence in the individual, reduces anxiety, and supports creative play (Samborski, 2010; Kuo & Faber, 2004). In a study examining the effects of nature on children's ability to cope with psychological stress, it was found that children with easy access to nature had lower stress levels and higher feelings of self-worth than children who were very close to their hearts. It proves that nature can increase resilience against stress (Wells & Evans, 2003). "How does time outside and contact with nature affect health and learning?" The question is a widely researched topic. It is emphasised in the studies that natural contact reduces stress and creates positive effects on human health. There are two specifically prominent explanations for how nature can reduce stress. For one, nature can stimulate less used areas of the brain, and a lack of concentration distracts from stressors. Second, nature can strengthen cognitive resources such as attention or problem-solving (Largo-Wight et al., 2018).

Nature also has healing properties on the learning activities of children with attention deficit and hyperactivity disorder. Many studies examining the relationship between the time children spend in nature and their ability to focus on the work they do show that children with attention disorders can increase their concentration and improve their focusing skills during the lesson after the time they spend outside (Wells, 2000; Kuo & Faber Taylor, 2004; Mårtensson et al., 2009; Akpınar, 2016; Bogenç, 2021; Yılmaz et al., 2023).

Nature-based games support young children's creativity, agility, balance, and physical activity (McCurdy et al., 2010; Cosco et al., 2010; Milteer et al., 2012). Compared to indoor and traditional playgrounds, outdoor children are more relaxed, happy, focused, creative, and well-behaved. More materials and activities are needed in natural environments, which means more opportunities for competition and socialisation (Dennis et al., 2014). Despite all these positive effects, as Louv (2010) states in our age, "Nature is an abstraction rather than a reality for the new generation. Day by day, nature has become something to be watched, consumed, dressed, and even ignored". At the point reached today, the capacity to enjoy and benefit from nature has evolved into apathy and fear (Altman & Wohlwill, 1978).

Nature-based open-air classrooms offer opportunities for children and teachers to experience the change processes of nature at various temporal and spatial scales. Children can closely observe the life cycles of plants and animals and experience how nature changes from season to season and from year to year. For example, students can observe the decay of wood, the transformation of leaves into humus, the beginning of seeds growing and yielding, and interact directly with plant materials as a game decoration. In addition, students can associate their outdoor experiences with the curriculum and reinforce the lessons they teach indoors better with outdoor classes.

In this context, open-air classrooms, emphasised within the study's scope, stand out as an alternative to the traditional classroom model in which nature is wholly alienated and ignored. It is thought that immersive learning spaces can be created by transitioning to this new and egalitarian model, which reminds us of the reconciliation attitude between humanity and nature from the beginning but is gradually eroded. Within the scope of the study, the extensions of this situation are tried to be explained through the semi-structured interview technique carried out with teachers and vocational practitioners and to develop exemplary open-air classroom models.

1.1. Outdoor Classroom Concept and Its Historical Development

Outdoor classrooms, which can be seen as a general definition of all spatial potentials within the school's boundaries, are teaching-learning spaces where teachers and students can come together and integrate with nature (House, 2018). According to Nelson (2012), the primary function of outdoor classrooms is to fully benefit by strengthening children's interactions with the outside world, both qualitatively and quantitatively. Open-air classes, a teaching method that encourages students to engage in activities related to their interests, are also defined as a learning philosophy that makes users more active physically and includes various learning methods (Jordet, 1998). More specifically, outdoor education is a process that provides for regular activities and personal experiences outside the classroom, where students can use all their senses and creativity. This learning environment provides more spontaneous games, experiences, and social activities for academic activities than the traditional classroom environment offers opportunities (Burnett et al., 2021). At the same time, outdoor education has the feature of being contextual, realistic, and practical. The approach is a gradual process in which students are first introduced to and prepared for outdoor activities in the classroom. Before meeting in the classroom, go out into the open air, where activities occur. In addition, the open-air learning environment represents an informal learning space where student expectations that cannot be realised in traditional classrooms occur. It has a rich structure that can offer different learning opportunities. Researchers emphasise that education in nature is not a method to be applied only on days when the weather is nice but can also be applied on cold or even rainy days if students dress appropriately (Myhre & Dewaele, 2022).

Outdoor learning is not a new perspective; for centuries, many scientists have recognised the positive effects of natural learning environments on children. Friedrich Froebel, who established the first kindergarten in 1837 by using the word "Kindergarten", which means garden for children and translated into Turkish as kindergarten, sees these spaces as a way for people better to understand their place in themselves and the world and to diversify their connections in this sense (Constable, 2012). Being one of the pioneers of breaking away from the traditional education model in which teachers and parents shape the student's perception of the world in an imposing way, Montessori continued her studies on child education with an attitude based on exploration and togetherness with nature, similar to Friedrich Froebel, through the activities chosen by the children themselves (Constable, 2012). In this way, Montessori is one of the leading names that combines self-referential and free choice with indoor and outdoor learning spaces.

Open-air classrooms have emerged in England as a reform movement in education, under the influence of progressive education philosophy, since the late 1950s. In the process up to these dates, it is seen that the teachers are teacher-centred, the students are passive receivers only in fixed rows, and the learning-teaching process is mainly based on listening. After the Second World War, this traditional classroom environment was questioned, focusing on student needs (Shield & Greenland, 2010). This type of classroom, first used in European preschool education, draws attention to the fact

that children can produce and learn independently in a less structured environment (Constable, 2012). Outdoor education, which started to gain visibility with the nature study movement in the Victorian and Edwardian periods of England, gained value as a potential process in which one-to-one relationships with living things are established instead of offering a dry and dull interaction like in museums (Rickinson et al., 2004). In this sense, one of the leading educators, Dr Lilian Clarke, underlined the importance of open-air classrooms and stated that with a pro-active attitude and a learner-centred education model, workbooks should arise directly from the work done in the gardens. The primary reason for the construction of these schools, which were designed as open pavilions due to financial problems, was to provide children with access to fresh air and sunlight (Yaman, 2005). These open-air classes, implemented for the first time in post-war England, started informally in primary schools. In the report titled "Children and Their Primary Schools", published by British educational scientist Bridget Plowden in 1967, the importance of open-air classrooms and informal processes in the education process was mentioned, and incentives were made to disseminate this practice in all schools. American pedagogues visited the open-air classrooms in England, and as a result of the studies, the implementation of open-air classrooms began in the USA (Rothenberg, 1989). Later, considering the effect of natural learning environments on the development of the child, the concept of open-air classrooms started to take place in the education curricula and policies of many countries, especially Scandinavian countries such as Denmark, Finland, and Norway, from an early age (Waller et al., 2014).

This kind of educational venue, which started to be used due to a practical limitation without ideal aims such as making a revolution in education, later brought learning through the common denominator with nature, which is one of the oldest educational approaches that have existed in the historical sense but are new for modern times. There is no data on the practice of outdoor classes, which have evolved in Türkiye.

1.2. Importance and Effects of Outdoor Classes in Education

Open-air classrooms that encourage students to move between indoor and outdoor spaces without interruption create social environments in which the student is the one who reveals the activity and initiates the learning process freely (Nelson, 2012). With the freedom offered by the flexible space, instead of the hasty and single-focused education approach brought by the rote-based teaching process, students learn to use time in an exploration-oriented way in open-air classes. In this sense, it opens new horizons for the learner beyond only human beings, providing multifaceted social interaction opportunities with non-humans, in which every process of understanding the world in cognitive terms embodies, becomes interconnected parts, and the extent is beyond a single approach. With the activities in these places, students can understand that nature has a right with the deep bonds they have established at a young age. With the demonstration that the response of all kinds of interventions on nature will be reflected strongly, open-air classrooms include natural processes in the education and learning process and put physical activities at the centre of spatial experience.

External environments positively affect the child's cognitive and physical development, communication, socialisation and emotional development, socio-cultural identity, concentration level and learning motivation. Some researchers argue that outdoor learning environments are critical in the child's development and that indoor learning environments alone are insufficient for educational activities (Davies & Hamilton, 2018). On the other hand, access to traditional outdoor playgrounds such as streets, gardens, and wildlife parks is decreasing daily (Rickinson, 2004) due to parents' fear of bullying their children, traffic hazards, and decreased natural and playground areas. Today, with fully digitalised interaction and communication potentials, students can interact with nature and experience other aspects of this interaction only on a limited and one-way level in their closed echo chambers. In this sense, open-air classrooms that can be integrated into educational structures are rare areas where children and young people can still interact with the outside world.

In the study of Vural & Yılmaz (2018), researchers determined that appropriate landscaping practices in school gardens contribute to students' satisfaction with physical conditions, environmental awareness, psychological relaxation, learning new things, increase in school success, use for

educational purposes, and reduction of collisions and accidents during breaks. With a similar approach, Schäffer & Kistemann (2012) focus on the contribution of outdoor kindergarten classrooms to subjects such as physical activity, concentration, mental health, and language development (Schäffer & Kistemann, 2012). The opportunity to continuously experience the natural experiences that these environments provide to the students, which results in positive health effects, improves students' communication with other children, their parents, and teachers. These classes, which encourage the development of skills such as calling for help or overcoming problems in emergencies that may be encountered in nature, develop feelings of security and togetherness with the ritual-like activities they perform. The absence of mass-produced toys and the playground and the fact that strict boundaries do not determine game types and are result-oriented could open the way for creative play possibilities with the natural materials in the environment.

Outdoor classrooms, which should be defined as the intersection of many disciplines such as education, architecture, landscape architecture, ecology, and health, stand out in all these disciplines with their different aspects. In landscape architecture, outdoor, playground and environmental learning aspects are emphasised (Kaplan, 2020), while in architecture, behavioural studies that occur within the game-architecture integrity and the effect of gardens are focused on (Khan et al., 2019). The benefits of outdoor environments for children have been widely documented. Nevertheless, in these studies, researchers are concerned about the level, quality, and effects of outdoor learning.

In this context, open-air classrooms are defined as immersive learning tools with multifaceted dialogues between beings living in a typical environment. In these spaces, where an egalitarian approach is thought to exist between humans and non-humans, productive connections and interactions are created where there are no definite distinctions and where there is movement. In this sense, the study expands the discussion with semi-structured interviews. It analyses proposed model proposals beyond just a theoretical approach to outdoor classrooms, examples of which are rare in Türkiye. In this context, the literature was examined to analyse the effects of outdoor classrooms. It was determined that the impact of outdoor classrooms on students was generally grouped into four groups, including effects on cognitive, psychomotor, development, affective and social development.

1.2.1. Effect on cognitive development

Waldron et al. (2016), who put attention to the cognitive importance of outdoor classrooms in terms of the correct interpretation of analytical data and the complete understanding of the reflection of theory in the practical field, emphasise the importance of spatial abilities required for disciplines such as geology. Open-air classrooms, which allow a geology student to perceive the earth, which is the field of study, directly, in three dimensions, apart from the superficial and opaque descriptions of the textbooks, contribute to understanding the dynamic structure of the inferences from everyday experiences. Researchers addressing this issue in geology education provide clues that similar situations can be applied to other fields of study and learning paths. As can be seen from similar examples, a large part of science and intellectual curiosity and learning processes are based on practice. In this context, outdoor classrooms act as critical mediators and learning catalysts that enable the application of raw information in life by mind-filtering it. According to Piaget, the educational philosopher, children's daily natural and built life environments should always be stimulating and keep them alive in a way that pushes them to seek multiple ways of discovery (Berk & Winsler, 1995). The open-air classrooms designed in this direction will create various stimuli and keep the spatial experience alive with their flexible equipment and free-space setups. The learning act occurs in the educational environment where these different stimuli coexist. Thanks to the various potentials and guides of this environment, called the classroom, students can interact actively with stimulants and other entities (Yaman, 2005). Therefore, outdoor classes should have enough external stimuli.

According to the observations made about the roles of primary school students in field studies, improvements in the built environment can directly contribute to cognitive development (Rickinson et al., 2004). In addition to the various positive effects, these spaces, which significantly improve the cognitive abilities achieved in a classroom environment, create long-term "memory episodes", according to Nundy (1999). Thus, such environments have an encouraging role in the observation and

interaction in nature to produce effective results by establishing memory sequences with these experiences, remembering and understanding functions powerfully. Milton et al. (1995), on the other hand, conducted an ecology-themed field study with fifth-grade students. Researchers who observe the development of social skills and their knowledge in the field of ecology say that they internalise the knowledge and extensions of the park they are in through cooperative games and group projects. In addition, they draw attention to the area's development of belonging and self-reliance. Malone & Tranter (2003) focus on problem-solving and creative thinking abilities, and they refer to the expansions of play and external interaction in cognitive development. In this sense, open-air classrooms emerge as an essential element in contributing to the processes of remembering and understanding, the development of social skills, the experience of division of labour-solidarity, and similar skills to students. Learning with different types of cognitive development that enable the child to live in an integrated way into social life is provided through a lived experience.

1.2.2. Effect on psychomotor development

The motor effect, another effect, indicates the child's ability to understand spatial elements and the dynamic structure and functioning of nature and to use it in his/her life. For example, besides versatile and inclusive learning opportunities, the student's eating habits, who continue the natural education process, are shaped according to the living environment (Blair, 2009). The child, who understands the dynamic movement of nature with the development of healthy eating habits, can establish imaginary interactions and strengthen his/her interaction with physical relationships at any time. Users in outdoor classes, which encourage the development of strength and balance, constantly experience the physical activity opportunities offered by this natural medium. In proportion to the intensity of this time they spend, they can establish a coexistence with nature and consider the possible consequences of human impact on the environment (Chawla, 1999).

According to a study by Dennis et al. (2014) on outdoor classroom users, such spaces are generally defined into four basic categories. Experience of the outdoor environment in a natural environment, the performance of the designed rooms, maintenance and sustainability, and official recognition in the eyes of various authorities were found to be intensely physical factors among the prominent features in these categories. Students experience the most influential aspects of being in the natural environment through themes such as adapting to changing seasons, participating in extracurricular activities, establishing different habitats for learning, interacting with other beings, and experiencing physically challenging situations (Dennis et al., 2014). The research conducted by Bogner (1998) in a national park in Germany highlights the importance of giving students the actions they will take in their environment through tools that will lead them to responsibility. In this sense, the student who experiences the environment primarily can understand the importance of participatory and collaborative interaction and adequate preparation (Bogner, 1998; Rickinson et al., 2004). According to Constable (2012), the physical development of children in outdoor classrooms should be given equal importance in developing fine and gross motor controls. Children aware of the built and natural environment around them gain environmental experience by transforming various obstacles and irregular surfaces around them into a part of their actions. Such areas contribute to developing coordination with their potential, such as climbing, crawling, and balancing. According to Atabay (2014), learning environments should not only develop children's cognitive and social aspects with aspects such as exploration, experimentation, play and discussion but also should have intermediaries that allow physical exercises and movement and thus enable the emergence of physical abilities.

1.2.3. Effect on affective development

In the analysis of Khan et al. (2019) on various quantitative and qualitative studies, it was seen that students who were insensitive and uninterested in multiple courses, such as natural sciences, participated with great enthusiasm and motivation when the same courses were taught in open spaces. In this sense, outdoor classrooms can be seen as intermediate planes where the lessons are efficiently transferred and articulated as extensions of each other rather than an option where indoor classrooms will ultimately replace them. Games, another critical factor in permanent learning and producing knowledge, have been determined to increase children's exploration and internalization

potential (Dennis et al., 2014). The study of Fagerstam & Blom (2013) suggests that learning biology and mathematics in an outdoor environment has a positive cognitive and affective impact on 13–15-year-old (Fagerstam & Blom, 2013). Similarly, Eick (2012) reports that the use of the outdoor classroom and nature supports science and literacy learning. On the other hand, students who are in a state of discovery in which their sensitivity to the environment will increase can take responsibility for the space. In this way, they can exhibit behaviours of protecting owning natural and public spaces that a person's belonging cannot limit.

Outdoor classrooms enable them to express themselves more easily with the natural, lively, and dynamic environment created by spatial self-behaviour, enabling emotional integration and maturation. It plays an active role in acquiring self-discipline, self-confidence, and anxiety control (Samborski, 2010; Dennis et al., 2014). Considering that children with more access to the natural environment have a higher potential to cope with psychological problems than children who live in isolation and closed life, they can express themselves better with the spatial possibilities of open-air classrooms. It can be predicted that children who can value their personality will have a solid reaction to the emotional changes they will experience and that their resistance to stressful events will be higher (Dennis et al., 2014). Such abilities can develop in environments such as an open-air classroom where the child can feel more comfortable and accessible. As emphasised, one of the main factors in this situation is the opportunities the built environment provides for the individual. In the study of Nundy (1999) on the development of cognitive abilities in outdoor classes, results revealed that the gains in one emotional and mental domain strengthen the other. Educational processes in open-air classrooms, which are advanced by the close perception and understanding of the natural processes of the child who continues his sensory development, provide similar contributions to the development of respect for nature and the awareness of protecting nature. Such environments also provide self-confidence by enabling the child to move and feel more comfortably and freely in personality development. Students who dynamically experience the built and natural environment in the process can realise the similarity of topics such as responsibility, cooperation, and togetherness with the cyclical processes in nature. In this sense, they have the potential to apply to nature in their later experiences as the primary source of inspiration.

1.2.4. Effect on social development

Regarding social development, the last category of influence, Vygotsky, states that the social environment is a scaffolding in the child's development (Wood & Middleton, 1975). This supportive system allows the child to progress in self-construction and personal development. With each new competence gained, the child advances his/her social skills and mental development. The students in the classrooms where this process occurs actively work to solve the problem and are in social solidarity. The Reggio Emilia early-age education program in Italy can be given as an example of a child development approach that increases learning efficiency through relationships established with others such as peers, teachers, and parents. According to Berk & Winsler (1995), who put the decision-making mechanism shaped through the mutual relations of students and teachers at the centre of development, open-air classrooms are the most suitable places that allow this approach. The impact of these classes on social development gains value through establishing multiple relationships and interactions with many factors, especially the student's peers and teacher.

Based on open-air classrooms, the educational approach creates an accessible learning environment whose boundaries cannot be fully drawn. In this sense, this understanding of education, in which all possible relationships need to be clearly defined and tried to be classified, also reflects on spatial factors. In this respect, it differs entirely from teacher-centred approaches. Outdoor classrooms, where solidarity exists among all elements of human and non-human nature, show that an education method that is not fully human-centred and in which the right of nature is protected and respected is possible. The student in natural processes such as decay, obsolescence, deterioration, rebirth and renewal, which man cannot control, creates a democratic environment in which various relations between different actors are brought to the fore. Considering the current global climate change and ecology-related discussions, it is crucial for such problems affecting the world to be experienced directly in a

social environment and to be included in the memories to embrace the subject thoroughly. An approach based on superficial theoretical knowledge can inclusively affect education to create permanent awareness for the future instead of addressing such problems and not giving enough value. In this sense, teachers and students who closely experience the external extensions of the space can experience the world in a medium where they can respect all existence. The role of the teacher in such a space is to design activity schemes and frameworks in which students can foster collaborative knowledge and dialogue (Berk & Winsler, 1995). In this process, it is necessary to ensure that an ambiguous and constantly changing structure can be experienced. Outdoor environments, whether natural or playground, allow children to be themselves, research, examine, and act actively and freely. In addition, these open and spacious spaces allow peer interaction to occur spontaneously and in an unlimited context (Stan & Humberstone, 2011). Children lay the foundations of socialisation in these areas where healthy communication is established with peers and nature. Acting from a common denominator, such as the discovery of nature, students can make this process more gripping by establishing strong relationships among themselves, and the information and discourses conveyed by the teacher can be seen as more focused and concentrated. They can learn to exhibit solidarity by directly experiencing nature's reflections collectively. Within the multi-layered network of relations in which he/she is directly involved as the leading actor, the child can more clearly integrate the spatial effects of his/her classes into the content of his/her daily life (Dennis et al., 2014). At this point, the necessity of designing and applying free and motivating promoters and guides that can enable students to experience a correct and inclusive approach to spatial design emerges.

As a result of the literature review on outdoor recreation and learning environments, the information obtained on the effects of outdoor classrooms on the child's development is summarised in Table 1 under the headings of cognitive, psychomotor, affective, and social development.

Table 1. Effects of outdoor classrooms on paediatric development (Edited by authors in line with the information obtain from the literature)

Cognitive Development	Psychomotor Development	Affective Development	Social Development
<ul style="list-style-type: none"> ▪ Focusing ▪ Immersiveness ▪ Reducing anxiety ▪ Learning through practice ▪ Enhancement of the curiosity ▪ Multi-layered exploration with sufficient stimulus ▪ Being in active interaction with stimulus ▪ Suggesting solutions through teamwork ▪ Effective observation and interaction ▪ Vital processes of remembering and understanding ▪ Focused learning through teamwork ▪ Creative thinking and problem-solving 	<ul style="list-style-type: none"> ▪ Understanding the processes of nature and reflecting it in life ▪ Adaptation to changing climates ▪ Experiencing natural materials and processes ▪ Direct interaction with living creatures ▪ Studying habitats ▪ Observing the changing seasons ▪ Maintenance of natural systems ▪ Having eating habits in nature ▪ Developing endurance and balance ▪ Having responsibility based on recurrences ▪ Consciousness of responsibility based on repetition 	<ul style="list-style-type: none"> ▪ 3-Dimensional direct approach ▪ Abundance of stimulus ▪ Participation in lectures ▪ Motivation and enthusiasm ▪ Multi-directional use of senses ▪ Sense of belonging ▪ Appropriation ▪ Taking responsibility ▪ Protecting natural and public spaces ▪ Expression of oneself in a natural, dynamic, and vital environment ▪ Integrity and maturity ▪ Self-discipline ▪ Self-confidence ▪ Freedom 	<ul style="list-style-type: none"> ▪ Participation ▪ Collaboration ▪ Solidarity ▪ Being responsible ▪ Active participation and creation in the collective acts ▪ Cooperatively problem-solving ▪ Production of the mechanism of co-decision ▪ Multi-interaction potentials between teachers and students ▪ Free social communication ▪ Emphasis on student-centred education

1.3. Design of Outdoor Classroom

The open-air classroom design, which cannot be thought of independently of an education approach based on sensitivity to nature, examined under four headings based on the versatility and experience it brings, differs from traditional classrooms in many respects. According to the Boston School Spaces Initiative Outdoor Classroom User Manual (House, 2018), these spaces are separate sitting areas for all students and small groups, plantings for the recognition of local fauna, walking paths to explore the

immediate environment, work surfaces to encourage the use of different natural materials, area maps, plant, and animal introductions. Outdoor classrooms should support children's freedom to choose what, how and where they play with what materials. (Bohling et al., 2010). According to a study by Kiewra & Veselack (2016), four essential elements affect children's creativity and imagination: predictable space, abundant and consistent time, open-ended materials, creative play, and adults who support, observe and care about learning should be considered in the design of these spaces. Children's experiences and the surrounding space's design are shaped and directed by the adults with whom they share this environment. In this sense, the prominent elements in terms of space design of outdoor classrooms are flexibility, predictability and having enough space. According to the researchers, these areas, which are designed in such a way that students acquire concepts and knowledge through play, can create their games with changeable, non-fixed and flexible parts, allowing children to spend more quality time with themselves and with each other, and to freely recognise objects. Play is children's way of exploring the world around them. Playful children discover and transform their environment per their needs (Almon, 2013). Children can participate in open-ended games whenever they want, in which they have an active voice. They can often try to entertain themselves and their friends without being forced by external factors. Outdoor classrooms with interesting natural materials encourage children to engage in creative activities instead of ready-made toys where they can only perform specific actions.

Students can experience difficulties in the face of problems with their own developed approaches, observed by teachers, and their information processing and solution-generating skills directly and freely in open-air classrooms. These classrooms, which allow for safe and predictable actions, should give students the freedom to pursue and continue the work they have started and their responsibilities in the daily routine. With these environments, which teach by living, the child can find the opportunity to learn directly the existence of dynamic natural processes, which allows for making free choices and facing its benefits. Outdoor classrooms should have sufficient facilities to encourage the student in learning, physical, social, psychomotor, affective, and cognitive development. On the other hand, Schäffer & Kistemann (2012) draw attention to the immersive characters in the landscape arrangements of forest kindergartens of similar nature and safety because children can construct their games. According to the researchers, even if the students are not present in the environment, they can remember and effortlessly recognise the area so that it is not just a wall. In this way, the experience takes its place in the memory, and the space can become a living place. In this situation, in which the student tries to maintain a solidaristic life flow established on common ground by feeling responsibility for nature, questions can be formed in the mind of the child more quickly, and they can be directed to the outside world more enthusiastically with an effort to seek answers. The purpose of outdoor education is to support the individual's awareness and knowledge about nature, society, nature-society interaction, and self-development. Outdoor education can include activities based on working together, developing new skills, and protecting nature. The intended outcomes of such experiences are to support personal and social development. Similarly, Pürlüsoy & Eliboy (2022) highlight that learning spaces should be designed by considering various factors such as dimensional aspects, spatial organisation, furniture, equipment, materials, educational tools and equipment, lighting, ventilation, climate, colour selection and hygiene conditions. Embodying these design aspects would provide positive educational, physical, emotional, and psycho-social support to students in learning spaces.

2. Methodology

Based on the views of teachers and designers (architects and landscape architects), this study, which aimed to create models for exemplary outdoor classroom design in school gardens, was carried out in a qualitative research design. Qualitative studies that reveal the phenomenon in the context of subjective data, such as the participants' opinions, experiences, perceptions, and interpretations, are the studies that reveal the phenomenon/event in its nature and integrity (Ilgar & Ilgar, 2013; Merriam & Tisdell, 2016). Qualitative studies try to explain, interpret, and give meaning to the researched subject based on the data instead of generalising (Ilgar & Ilgar, 2013). In this context, the Embedded Theory approach, one of the qualitative analysis patterns, was used in this study to present a realistic and descriptive model to the reader using the data obtained. The Embedded Theory method produces theories, concepts, hypotheses, and suggestions directly from the systematically collected and analysed data and is characterised as an inductive model development process (Creswell, 2003; Bitsch, 2005; Onat, 2011).

2.1. Working Groups

Because qualitative research is mainly based on observation and interviews, it is usually conducted with smaller groups and fewer samples than quantitative studies. Another reason large and large sample group are not needed in qualitative research is that observations and interviews start repeating themselves after a certain period. The number of participants in the study is small, and the data obtained are much and detailed (Ilgar & Ilgar, 2013; Baltacı, 2018). Within the scope of the study, a study group of 20 people consisting of teachers and designers (architects and landscape architects) was determined using the maximum diversity sampling, one of the purposeful sampling methods. Purposeful sampling is a method that facilitates the detailed examination of situations that are thought to contain rich information (Yıldırım & Şimşek, 2008). Maximum diversity sampling aims to determine whether there are any typical or shared phenomena among the diverse situations and to examine the different dimensions of the problem according to this diversity (Marczyk et al., 2005). In this context, in selecting the sample, it was considered that the teachers were of different genders, ages, branches, professional experience and education levels and that the designers had other genders, ages, professional experience, and fields of activity. These factors determined ten teachers, seven architects (who have experience in education buildings) and three landscape architects. The codes are used in the text as T1, T2, etcetera for teachers, A1, A2 for architects, and LA1, LA2 for landscape architects instead of the participants' names to ensure the participants' privacy. The research was conducted in the cities of Trabzon and Rize in the Eastern Black Sea Region. Table 2 contains general information about the participants.

Table 2. Information of participants

Participant Code	Gender	Age	Length of Work Experience (Years)	Discipline	Field of work
T1	Woman	38	19	Elementary School Teacher	Elementary School
T2	Woman	32	10	Elementary School Teacher	Elementary School
T3	Woman	41	12	Elementary School Teacher	Elementary School
T4	Woman	43	17	Elementary School Teacher	Elementary School
T5	Man	65	42	Math Teacher	Elementary School
T6	Woman	40	16	Elementary School Teacher	Elementary School
T7	Woman	28	3	Music Teacher	Elementary School
T8	Woman	41	16	School Counsellor	Elementary School
T9	Man	42	16	Natural Sciences Teacher	Secondary School
T10	Woman	33	11	Preschool Teacher	Preschool
A1	Woman	43	21	Architect/Academician	University
A2	Woman	53	33	Architect	Public Institution
A3	Woman	44	22	Architect/Academician	University

A4	Woman	30	5	Architect	Private Office
A5	Woman	31	4	Architect/Academician	University
A6	Woman	52	25	Architect/Academician	University
A7	Man	39	18	Architect	Private Office
LA1	Woman	41	18	Landscape Architect/Academician	University
LA2	Man	35	9	Landscape Architect/Academician	University
LA3	Woman	28	3	Landscape Architect/Academician	University

2.2. Data Collection Tools and Analysis of Data

The study used a semi-structured interview as the data collection method. The reason for using this method in the research is that it is not possible to obtain the desired data with closed-ended questions. The semi-structured interview technique, which is based on pre-prepared interview questions, provides the researcher with the opportunity to obtain more systematic and comparable information (Yıldırım & Şimşek, 2008). In addition to the need to inform the participants in the position of data source about various concepts and to help them explain and exemplify their ideas, additional questions may be needed during the interview; this is another reason for using this technique. In this context, it is aimed to obtain data about participants' ideas about the physical and functional conditions of the school gardens in the region where they live, the purpose and characteristics of qualified school gardens, their knowledge about outdoor classrooms, the possible effects of outdoor classrooms on students, their willingness to teach in an outdoor classroom (only addressed to teachers), the characteristics of an ideal outdoor classroom, to the courses and education levels for which outdoor classrooms are suitable.

The interviews were conducted face-to-face with the participants who wanted to contribute to the study voluntarily. Interviews were conducted at different times with each participant. Questions were conveyed before the interview for the participants' information about the subject. At the beginning of the face-to-face interview, information was given about the purpose of the study. It was ensured that the data obtained would only be used for scientific purposes. And personal information would never be shared. The interviews were recorded through a voice recorder with the participants' permission to facilitate the analysis of the data obtained during the interview and to prevent data loss. Each interview took an average of 20-25 minutes. After the interviews, the audio recordings were deciphered and arranged in the Word program, and the analysis phase was started.

During the analysis phase, the data containing the ideas used and repeated by different participants were determined, codes were created, the codes were arranged in clusters according to their standard meanings, each set was transformed into a category, and the coding sequence continued until a new class did not emerge. Categories are also grouped under a theme. More abstract and general themes are essential in showing the research problem's dimensions. By developing the abstracted themes and the ideas they express, an exemplary outdoor classroom model has been tried to be created.

2.3. Validity and Security

In qualitative studies, research must be valid and reliable at a certain level to be accepted. Determining the validity and reliability of the data collection tools, research design and data analysis used in the research affects the study's credibility and degree of acceptance. Although there are different measurement methods for the validity and reliability of quantitative research, it is impossible to determine the validity and reliability of qualitative research (Guba & Lincoln, 1994; Shenton, 2004). In this context, data collection tools were developed by taking the opinions of experts (3 academician architects) to ensure the content validity of the interview questions about the validity-safety of the study, and the researchers finalised them. To prevent the wrong transfer of data that may arise from the subjective interpretations and assumptions of the researcher, two participants, a teacher and an architect, were given interview analysis, and they approved that their statements were written correctly. In another application, themes and codes related to the validity-security of the study were

reviewed at regular intervals, errors were better recognised, and necessary adjustments were made. In addition, experts who had little contact with the participants and could interpret the findings were consulted to organise the research, name the determined themes, and evaluate the relationship between the theme and the code.

3. Findings

In this part of the study, the answers given by the participants in the semi-structured interviews were analysed with an inductive method and firstly converted into codes, then into categories and finally into themes. Table 3 was obtained when the emerging themes were associated with the research questions.

Table 3. Themes created according to data analysis

Questions of Inquiry	Themes
Opinions on physical and functional aspects of school gardens	Physical Aspects Functional Aspects Security Location Image
Opinions on the purpose of use and characteristics of high-quality school gardens	Functional Aspects Relationship with interior spaces Relationship with nature Spatial Organisation Typology of Spaces Equipment Structure and design of floor Universal design Plant-based design Physical aspects Security Being non-distractive
Current knowledge and ideas of participants in outdoor classrooms	Knowledge source Differences compared to indoor classes Evaluation of its current state in Türkiye
Opinions on the possible effects on students	Effects on cognitive development Effects on psychomotor development Effects on affective development Effects on social development In the cases of natural disasters and pandemics,
Opinions on motivation to have lectures in an outdoor classroom	Motivation to have classes in an outdoor classroom
Lectures and education levels compatible with outdoor classrooms	Education levels Lectures
Opinions on qualities of an ideal outdoor classroom	Type Quantity Design principle Functional aspect Order of sitting Equipment Type of equipment Material of equipment Location Border Type of border element Cover type Characterisation Relationship with nature Design methods for the future

3.1. Views on the Physical and Functional Conditions of School Gardens

As a result of the evaluation of the answers given by the participants, their views on the physical and functional conditions of the school gardens in the region they live in were grouped under five themes: physical features, functional features, location, security, and image. These themes and their codes are presented in Table 4.

Table 4. Participants' opinions on the physical structure and functionality of school gardens in their region

Themes	Codes	Frequency (f)
Physical aspects	Structure of hard floor	10
	Inadequate/Missing garden size	5
	Inadequate/Missing natural areas	5
	Inadequate/Missing equipment	5
	Typical projects/Linear organisation	4
	Using of colours	1
	Type/amount of garden	1
	Inappropriate design and layout on the field	1
Functional Aspects	Improper design in the context of climate/Missing covering	1
	Inadequate spatial diversity/Fewer options	16
	Inadequate functionality	6
	Vague areas	4
	Two-dimensional organisation	2
Location	Using as a parking lot	1
	Inappropriate to the seasons of the area	1
Security	Urban location	5
	Using as a bus-stop area	3
	Situated in a congested urban location.	2
	The inadequate connection between different heights	1
Image	Hard floor	1
	Value	1

As seen in Table 4, the 'physical properties theme' consists of 'hard ground structure', 'insufficient garden size', 'lack of green space', 'lack of equipment', 'type project/uniform arrangement', 'use of colour, type/number of gardens', 'unsuitable layout/design for the land', 'high garden walls', 'unsuitable for climate/lack of top cover' codes. On the subject of 'hard floor structure', emphasised the most, the participants stated that the floors of the school gardens consist of cold-looking hard material coatings such as concrete and asphalt. Regarding the insufficient garden size, the participant with the code A7 stated as follows:

"Especially when the physical and functional conditions of the schools in and around Trabzon are considered, it is seen that they are designed and even tried to be located in an inadequate area with limited facilities as far as I can see. It is insufficient to meet the demands of schools to grow, open, semi-open, and closed spaces during the parcelling."

This statement shows that school gardens must be qualified to meet present or future needs. 'Lack of green space' means the green area is almost non-existent, and the user's access to the existing green areas is blocked or prohibited. With the statements under the heading of 'lack of equipment/inadequacy', the participants stated that the equipment did not support the development of children, did not attract their attention, and showed standard features. 'Typical project/uniform arrangement' is another subject that the participants complain about. Accordingly, school gardens consist of uniform arrangements similar to each other, such as school buildings. Regarding this issue, the explanation of the participant coded A1 is as follows:

"Because all the schools we see around us are similar, just like typical projects, schoolyards always look alike. But they do not differ much from each other functionally."

The most emphasised issue regarding school gardens' 'functional features' is 'insufficient spatial diversity/to offer too few options.' The participants stated that the buildings were planned functionally, whereas the school gardens were designed with minimum spatial diversity and more as a gathering and ceremonial area. In this regard, the following statements of the designer with A2 code are included:

"In schools, children go out to the schoolyards during breaks. They do not have a job to do. They run wildly, throw away their energy and go inside. There is no other activity because there is no arrangement or opportunity to offer it. The child is just running there, maybe going to the canteen, going out, running, nothing else. Since the ceremony areas are show areas, they are not designed for different events."

Another issue that most participants agree on about school gardens is 'functional inadequacy'. Due to the limited number of equipment and insufficient physical properties, school gardens offer the opportunity for very few actions that students need and want to do. 'Undefined areas' is a problem only architect's address. Within the scope of this problem situation, the participants expressed that the school gardens are just a void and that there is no regulation to encourage or guide the students. The thoughts of the architect with code A1 regarding this issue are as follows:

"... we see that children construct a game they will create in their minds in line with their dreams, in any place not defined for them, not for the planned games. For example, no such area exists for children who want to do an activity with their friends outside. Any part of the school, the children themselves transform that space."

'Location' is a common theme that teachers and designers emphasise. Under this theme, the location of the schools in the city was mentioned. Under the 'Security theme', the participants prioritised using the school garden as a parking area for the student buses and the vehicles belonging to the school staff, vehicle traffic, and the problems caused by the congested urban location surrounded by buildings. The concept of 'value', the only code under the 'image theme', is related to the fact that the value of the school garden still needs to be fully understood today.

3.2. Opinions on the Purpose and Features of Qualified School Gardens

As a result of interviews with teachers and designers, twelve themes in Table 5 regarding the purpose and characteristics of a qualified school garden were determined.

Table 5. Opinions on the purpose of use and characteristics of high-quality school gardens

Themes	Codes	Frequency (f)
Functional Aspects	Recreative/game activities	15
	Using to learning-teaching	12
	Using to socialisation	9
	Using to relax and resting	6
	Practice/plantation/hobby areas	5
	Individual use/Small group use	3
	Exhibition spaces	2
	Using to eat-drink	1
Relationship with Interior Spaces	Imagery connection	1
	Direct approach	1
Relationship with nature	Inside Nature	3
Spatial Organisation	Activity and gathering areas	4
	Organisation according to age groups	3
	Multi-functionality	1
	Creating sub-units	1
	Seating areas	1
Typology of Spaces	Amphitheatre	2
	Animal shelters	2
	Shadowed spaces	1

	Guest parking lots	1
	Welcoming areas	1
	Ceremonial grounds	1
Equipment	Water element	3
	Moveable spatial equipment	2
	Covering	1
	Being functional and secured	1
Structure and design of floor	Using natural areas	6
	Colourisation	1
Universal Design	It is appropriate to use everyone	2
Plant-based Design	Plantation/Forestry	5
Physical Aspects	Quality	1
Security	Distant with high-density human, vehicle and city areas	1
	Choosing secured material and plant	1
	Balanced isolation	1
Being non-distractive	Balanced communication with the environment	1

As seen from Table 5, according to teachers and designers, 'recreational/game activities' come at the top of their suggestions regarding the 'functional feature', one of the themes related to the purpose and characteristics of a qualified school garden. The views of the A1-coded architect on the subject are as follows:

"School gardens are an area where children meet outdoors. The primary function is to be used as an area where the children's need for activity and recreation can be met. Apart from that, areas may allow children to play planned or unplanned activities and games."

For the same problem, the teacher coded T7 expresses his thoughts as follows:

"Considering that children spend most of their days at school, they should have a space to throw their energy away. There should be more useful activities than running for them to have fun and play. There should be areas in the garden to distract their minds after 40 minutes of classes."

One of the suggestions teachers and designers emphasise most about the functional feature is using the school garden for teaching-learning purposes. In addition, according to the participants, this will support the lessons and significantly contribute to the students. For example, the designer with A1-code made a statement as follows:

"... I think that schoolyards can be used not only for sports, games, and activities but also directly for course content. Apart from that, it is not only for those who are based on such practices, but also, for example, to be able to take painting lessons outside in the summer months. Taking lessons outdoors, such as an open workshop environment, can give children different skills and effects."

Participants found the school garden's 'use for socialisation purposes' important. They emphasise that social and educational activities should occur throughout the school. The participants think that school gardens will be active in this regard. A5 coded participant expressed their thoughts as follows:

"Besides being open spaces, school gardens should serve as a qualified social space. It can be considered not as an intermediate space during breaks but a place for psychological relaxation, a kind of therapy space, and a place where it develops and strengthens social relations. These are things that develop the child socially, psychologically, and physically, as they develop both the psychology of the child -as well as the teachers' preparation for social life, his ecological and environmentally conscious perspective, his relationship with quality space and equipment, and his close contact with the landscape..."

Teachers and designers defined the spaces where students can rest, read a book, and relieve their mental fatigue during extracurricular hours, with 'use for resting/relaxation'. They also described school gardens supporting students' discovery and learning by doing, with 'application/plant growing

/ hobby areas. This statement is how the designer with code A1 explained their view on the practice/plant growing / hobby areas in the school garden:

"For some courses, application areas can also be used directly with educational content. So, a science lesson can be held in a green area there. We used to plant beans. We used to germinate our beans among the cotton. However, it can be carried out outdoors by spreading that growth event over time. For example, it is possible to get a product in a short time with a tomato seedling, or how the sun affects the growth time of parsley and how it affects the rain can be learned directly by using an outdoor environment such as a laboratory environment."

In the 'spatial organisation' theme, 'group gathering, activity areas' has been a prominent suggestion. With this suggestion, the participants suggested that students should be involved in socialisation, collaborative learning, peer learning. In the 'ground structure and design' theme, giving more space to green areas is necessary instead of the school garden consisting of only hard ground. Similarly, the theme of 'vegetal design' was advocated to show sensitivity to green areas and afforestation by drawing attention to the positive effects of the green element on children and adults.

3.3. Participants' Current Knowledge and Opinions on Outdoor Classes

The data on the knowledge and opinions of the participants about the concept of the open-air classroom, which is the main subject of the study, were discussed in three themes: 'source of information', 'difference from the closed classroom environment', and 'evaluation of the situation in our country' and presented with the codes contained in Table 6.

Table 6. Current knowledge and ideas of participants in outdoor classrooms

Themes	Codes	Frequency (f)
Knowledge source	Creating ideas	6
	Model projects	4
Differences compared to indoor classes	Concentration problem	5
	Having natural lighting, ventilation	3
	Being more free	2
	Classroom administration	2
	Having an awareness of nature	2
	Having more options	1
	Address the individual needs and creativity of students.	1
	Being non-distractive	1
	Direct relation with nature	1
	Freedom of seating/Freedom of listening position	1
	Being flexible and transparent	1
	Evaluation of its current state in Türkiye	Inadequate
Not appropriate for the education culture		1

Teachers and designers mainly presented their knowledge of the open-air classroom by 'generating ideas'. A group of architects also stated that they knew open-air classrooms thanks to the 'exemplary school projects' they examined. In another theme, "the difference between open-air classes and closed classrooms", the participants mainly emphasised "focus and concentration problem". The following statements of T1 and A4 coded participants are examples of this judgment:

"An environment where primary school students can easily be distracted... Because primary school children can be distracted quickly, they can focus on other materials quickly. In other words, even in a closed environment, 15 people can look out the window simultaneously, even at the sound of a flying bird or a crow." (T1)

"If there are other objects in the open air that can distract him, then he may not want to work, so he may have trouble focusing." (A4)

It is seen in Table 5 that the participants expressed many positive qualities, while a negative feature about the difference between open-air classrooms and closed-class environments stands out. One participant stated that outdoor classes are 'attention-boosting'.

3.4. Views on the Possible Effects of Outdoor Classes on Students

The opinions of teachers and designers on the possible effects of outdoor classrooms on students are gathered under five themes, and their content is summarised in Table 7.

Table 7. Participants' opinions on the possible effects on outdoor classroom students

Themes	Codes	Frequency (f)
Effects on Cognitive Development	In situ learning, learning with practice, learning with experiment.	6
	Permanent learning	5
	Motivation to learn.	5
	Contributing to academic success/achievement	1
Effects on Psychomotor Development	Creativity	
	Developing psychomotor skills	9
Effects on Affective Development	Providing a more accessible and peaceful environment	8
	Respecting and protecting nature	3
	Being away from technology	1
	Being self-confident	1
Effects on Social Development	Allowing being in a social space	4
	Having the potential to create effective interaction and communication.	2
	Expressing themselves comfortably	2
Using In the cases of natural disasters and pandemics,	Creating healthy environment	2

As can be seen from Table 7, the possible effects of outdoor classrooms on students according to the responses of the participants were examined in five themes: "effect on cognitive development", "effect on motor development", "effect on affective development", "effect on social development" and "use in natural disasters and pandemics". In the theme of 'impact on cognitive development', the participants stated that the outdoor classroom is a lively resource that offers substantial opportunities for 'learning by doing, experiential learning, permanent learning' thanks to its relationship with nature and the opportunities it has. The following statement of the educator coded T8 explains this situation as follows:

"Open-air classes will support learning in terms of a wide variety of learning methods, but a permanent learning method. It will be much more useful for children to internalise a small amount of knowledge by experiencing them rather than transferring pages of theoretical knowledge they will forget after a while. This concept of experiencing is the key concept that connects it with the outdoor classroom. Of course, learning by experience is also possible in closed environments, but there are more options in line with the physical qualities of the open environment."

In the participants' opinions on the subject, some assumptions that learning by doing is more permanent than learning from books. In this context, the child can explore nature one-on-one in open-air classes, and learning will be more permanent and effective when the studies provide practice opportunities. With the same theme of 'motivation for learning', the participants stated that open-air classes would positively affect learning, lessons would become more fun, and students would be more enthusiastic about learning. On this subject, the educator coded S7 expressed the following thoughts:

"The child could come to the lesson positively. I think she/he will learn by having more fun in the environment with the bright, natural light and bird sounds compared to the education she/he will receive in a closed environment."

It is another expected result that the qualities of outdoor classes that support activities and situations such as on-site learning, learning by doing, experiential learning, permanent learning, and motivation

to learn will also positively affect the student's 'academic development and success'. With the theme of "effect on psychomotor development" that emerged in line with the answers given by the participants, it was stated that the open-air classes provide the opportunity for different activities, encourage freedom of movement, and positively affect the nerves in the individual's brain with its fresh air, which will have positive results on the "psychomotor skills" of the student. The views of the A3-coded architect on this theme are given below:

"It is known that the positive effects of open air on physical and mental health are at the forefront of gains that require cognitive development. Children have a learning environment that will develop their fine motor skills in the open air. While their motor development is supported, they also show healthy social development as they can express themselves better."

Another possible theme of the impact of outdoor classrooms on students, which was reached as a result of interviews with teachers and designers, is "affective development." In the context of this theme, the participants emphasised that traditional learning environments in outdoor classrooms primarily destroyed the perception of limited space and controlling classroom management and offered users an environment where they would "feel freer and more peaceful". In this way, it is among the participants' opinions that students can focus on their work better and enjoy their activities. These positive effects on the child's psychology can also be reflected in their future life. The designer with code A6 states their opinion as follows:

These open-air classes seem more beneficial, ensuring children's self-confidence and safety and increasing their interest. So, think about it this way: there is a specific control in the classroom, there may be uncontrolled control outside, or maybe they are both under power and unaware of it. This position gives them confidence. So, they are watching me; are they watching me? Reveals their activities or actions without worrying or paying too much attention to others. Even if a child does it wrong, one may not say anything in the classroom, one is shy, one may not be able to act, and one may not realise what one wants to do, the situation is different with the energy given by the outside, it seems that one can act as he wants."

Under the title of 'impact on social development', which is another remarkable theme regarding the possible effects of outdoor classes on students, the views of the participants on 'providing a social environment', 'easy interaction and communication', and 'expressing oneself well' come to the fore. Participants argued that such environments in the open-air support communication and interaction between student-student and student-teacher, thus raising individuals with substantial social aspects. With the last theme of this question tab, 'use in natural disasters and pandemics, the participants, which means that education and training continue without interruption with open-air classes, expressed the indirect effect of open-air courses on students. The teachers who participated in the interview were asked whether they would like to teach in the open-air classroom. All the answers given by the participants included positive expressions.

3.5. Education Levels and Courses for Which Outdoor Classes Are Suitable According to Participants

Both teachers and architects were asked which education level and courses the outdoor classrooms are suitable for, and the answers are summarised in Table 8.

Table 8. Participants' opinions on educational levels and lectures suitable for outdoor classrooms

Themes	Codes	Frequency (f)
Education levels	All levels	9
	Elementary School	8
	Secondary School	6
	Preschool	3
	Highschool	2
Lectures	Natural Sciences	9
	All lessons	8
	Fine arts, drama, music	6
	Social sciences and humanities	5

Mathematics	3
Physical Education	2
Psychological Consulting	1
Turkish	1

While most participants thought outdoor classrooms could suit 'all education levels', 'primary school level' was the second most frequently mentioned type. Those who prefer the 'secondary school level' constitute a substantial number. When evaluated in general, it was determined that these learning environments mostly appeal to younger ages. As a reason for this situation, the participants stated that the students isolated themselves from many things due to test anxiety in advanced age groups and focused only on the exam. The following statements of the teacher coded T5 explain this situation as follows:

"The child has a goal in high school; one is locked on that goal. In high school, they study exam-oriented in Turkish conditions. The child knows the value of a question there. That is why he struggles to learn them. So, if you take him out to nature, he sees him as a waste of time. Let that kid learn to learn in the garden, in outdoor classes. He should come to high school to experience the outdoor classroom."

A1 coded designer drew attention to the learning types that vary according to age levels and stated that open-air classes would be more suitable for younger students (7-11 years old) who are in the concrete operational stage of cognitive development:

"Yes, I think that freedom is more limitless, more flexible applications, that is, more abstract thoughts can be more effective for groups of children in periods when information is not dense, but information that can be learned more concretely by seeing from the environment and knowingly is given."

As seen in Table 8, the 'science' and 'all courses' categories stand out in the theme of 'suitable courses' for outdoor classrooms. 'Visual arts, drama, music' and 'social sciences' were the most cited subjects. According to teachers and designers, open-air classes offer the opportunity to gain knowledge by doing and experiencing more than closed classrooms in nature-related, practice-oriented courses such as science and life studies, where experimental learning is effective. For example, T6 coded teacher expressed this thought as follows:

"The science course has a curriculum related to the environment in the 4th grade. These classes can be associated with science lessons and subjects such as environment, nature, recycling, and materials. There can be life studies lessons because we can teach life studies by living."

Most participants stated that all lessons could be taught in the open-air classroom with the appropriate arrangement and equipment preference according to the weather conditions and the studies. However, a teacher-intensive group of participants did not engage in painting, drama, music, etcetera and advocated that the open air motivates and inspires artistic lessons. The opinion that verbal tasks with social content can be handled easily in the open air has a remarkable rate.

3.6. Views on the Characteristics of an Ideal Outdoor Classroom

The answers given by the participants regarding the characteristics of an ideal outdoor classroom, which is the last question of the semi-structured interview, are grouped into fifteen themes and their contents are presented in Table 9 under the headings of theme, code and frequency.

Table 9. Participants' opinions on the qualities of an ideal outdoor classroom

Themes	Codes	Frequency (f)
Type	Extension of indoor classrooms	3
	Separate from Interior	1
Amount	Multiple	1
Design criteria	Flexibility	5
	Suitable to the seasons	4

	Preventing distractive elements	4
	Creating experiences to observe and explore.	3
	Allowing Freedom of Movement	2
	Zoning/Regioning/Creating sub-units	1
Functional Aspects	Kitchen/Preparing food and drinks.	2
	Individual/Small group Working Spaces	2
	Plantation	1
	Animal Care	1
Seating Order	Different from traditional seating order	4
	Amphitheatre seating order	2
Equipment	Flexibility/Transformability	9
	Nonstable/Moveable	3
	Suitable to activity	3
	Ergonomic	3
	Multi-purpose use	2
	Colourful	2
	Fixed equipment	1
	Protection from sun and wind	1
Maintenance	1	
Type of equipment	Technological equipment	3
	Not standardised equipment	3
	Cushion	2
	Musical Instruments	1
	Book spaces	1
Material of equipment	Natural, wooden materials	10
	Textile-based materials.	4
	Aluminum, steel materials	1
	Plastic based materials	1
Location	Not being close to the entrance area	3
	Sunny areas	2
	Defined, visible spaces.	2
	In front of the ground-level indoor classes	1
	Inside the school garden	1
Border	Openness/Closeness direction	4
	Flexibility	2
	Visual Continuation	2
	Endure to Sun and Rain	2
	Wooden Material	1
	Masonry Material	1
Type of Border Element	Moveable panels	3
	Glass/transparent surfaces	2
	Railing	2
	Plants	2
	Sliding Doors	1
	Equipment	1
	Low-levelled, hollow partition walls	1
	Curtain	1
Cover Type	Protection from sun and rain	6
	Natural/Wooden Materials	3
	Flexibility	3
	With transparent/steel, glass materials	1
	Creating defined spaces	1
	Height	1
Characterisation	Age Group	3
	Individual skill group	1
	Activities according to the education system	1
	Priority	1

Relationship with Nature	Inside nature, natural areas, soil, ground	3
Design methods for the future	Modeling/Prototyping	2

According to the answers given by the participants, in the context of the 'design principles' theme, flexibility, climate-appropriate design, and avoidance of distractions, in the 'seating arrangement' theme, different from the traditional seating arrangement, within the scope of the 'equipment' theme; flexible/transformable, in the theme of 'reinforcement material'; natural, wood material, textile-based material, in the theme of 'border'; the aspect of openness/closure, in the 'top cover' theme; protection from sun and rain have been the most repeated recommendations for an ideal outdoor classroom.

The design principle of 'flexibility', especially mentioned by the designers, means that the outdoor classroom is equipped and arranged in a way that allows different activities to be carried out alternately. The landscape architect with the code LA1 explained his thoughts on flexibility with the following words:

"Not all children are equally prone to the same activity. Spatial arrangements should be made in open areas where children can do different activities depending on their wishes."

Teachers willing to teach in the open-air classroom emphasised that the outdoor classrooms should be 'designed by the climatic conditions' to realise their desires. It has been stated that dispensers can be easily used in outdoor classrooms in all four seasons when necessary, and precautions are taken against climatic conditions such as rain, sun, snow and cold. Again, another issue that teachers focus more on is 'the prevention of attentional elements.' Outdoor classrooms are much richer visually and audibly than indoor learning environments. While this may positively affect the student, it can distract the user. In this context, the participants especially drew attention to the issue of noise isolation.

On the subject of 'spatial organisation', teachers and designers propose a layout for outdoor classrooms where students can sit on a chair or a mat whenever they want, different from the traditional sitting arrangement arranged side by side or back-to-back, and it can be transformed according to need. The most mentioned issue by the participants is about 'equipment', one of the critical elements of learning environments. It has been a flexible/transformable feature consisting of detachable and detachable modular blocks that develop the child's creativity, are unstructured, and provide the opportunity to use according to the child's needs. The participant's views on this situation are explained in detail by the M6 coded designer's statements:

"As equipment, there are wooden toys, wooden blocks, prisms. In general, if the equipment is something like that, they are open-ended if they are not fixed. If there is a place where they are stored, if the children go and pick them up when they need them, they can organise them according to their activities. Following their ergonomics, it can be light, simple, perhaps hollow, added, multiplied, or added to form a whole at certain heights. Maybe it will be used for sitting. It could be used for doing something else. If the table is already made up of blocks, as if it is on a chair, it will not have a specific function. Whether you get on it or sit down, you can do whatever you want, and it defines its function by itself. This situation also improves the creativity of the child. In the opinion of experts, do not buy ready-made toys for your children. Buy them elements they can play with, deal with, and reveal their talents. Then, inevitably, their imagination develops. They already have that talent."

Another issue that draws the most attention to reinforcement is 'material.' As reinforcement material, both teachers and designers use natural wood. While emphasising the preference for 'sourced materials', the use of textile-based materials is another type of material mentioned by the participants. In the interviews, 'wood' is the most said material because it is related to nature, gives a feeling of warmth, and does not harm the environment and user health. The view of the designer with the code M6 is the summation of the statements of all the participants regarding the material:

"Wood-based material should be preferred as material. Natural wood would be more reliable for children. Natural material makes more sense both visually and tactilely; it is less harmful to children, that is, metal can harm a child. So, its damage may be more than that of wood."

In the border theme, which effectively transforms open-air classrooms into a defined space, the participants emphasised that the learning environment should not be completely open or closed on all four sides. Nevertheless, there should be a border regarding the 'openness/closedness aspect'. For example, the designer with code A1 offered the following statements about this situation:

"I think that a border should be brought. It is partially open on all four sides. And it needs to meet with the school garden more flexibly so that one or two sides can be opened completely. Other surfaces are partially closed or with a border element; this can be a railing, another vertical component, or a curtain element. At least two sides should be opened more flexibly so that they can be opened entirely in a way that can expand."

Another design proposal that designers emphasise is the 'protection from sun and rain' feature, related to the 'top cover' theme. Since the city where the study was conducted receives precipitation throughout the year, the participants were exposed to sun, rain, wind, etc. It was stated that a top cover that can protect users against natural conditions must be included in outdoor classes. In addition, the participants drew attention to the fact that this top cover is produced from flexible, designed and natural materials that can adapt to changing needs, as in the reinforcements.

4. Conclusion and Recommendations

The answers to the research questions by the teachers in the role of educators and the designers who shape the physical environment in the interviews were analysed. The participants' complaints, opinions and suggestions about the school gardens and open-air classrooms were determined. In the evaluations, it has been determined that there are no significant differences in the views of the participants from different disciplines that affect the quality of education and that they even support and complement each other. In particular, the teachers, the primary users of educational buildings, have experienced the place one-to-one, constantly observing the students, knowing their needs better by communicating, and presenting many problems and suggestions to the designers about the learning spaces—architects, interior architects, landscape architects, etc., who design the physical environment. No matter how experienced the actors are in their profession since they cannot be the primary users of all building types, their experience of spaces with different functions may be insufficient for their designs from time to time, and they cannot master the tasks and requirements of the building as much as the active users. This situation brings to the agenda again how vital user-designer cooperation is and that user participation should be mandatory during the design phase of the projects.

The issue most frequently mentioned by almost all the participants in the evaluations is that the schoolyards in their area are physically and functionally quite inadequate, generally devoid of green spaces, and consist of a void with the appearance of hard ground. This problem is encountered in most of the school gardens throughout Türkiye. Vural & Yılmaz (2018), Aydın Türk et al. (2018), Yılmaz & Ertürk (2016), Karaburun et al. (2015), Safi (2022), Saygın & Güneş (2023), Aksoy (2021), and Başar (2020), there have been studies that support this conclusion. Most of the school gardens in our country have the same conditions, whether built by the state or by a private foundation, person or institution. Due to today's education policy-culture-curriculum and economic conditions, more attention is paid to the interior of educational buildings, and open spaces consist of a restricted, insufficiently sized space between the school building and the surrounding buildings, roads, surrounded by high walls. However, many researchers emphasise the importance of open-air and school gardens in the child's physical, cognitive, and emotional development. While Wells (2000) also argues that being in the natural environment supports the ability to focus and cognitive development, Towell (1997) states that it allows individuals to spend time both mentally and physically effectively in outdoor playgrounds designed according to children's age, growth, needs and interests.

Regarding activities in the school garden, the first thing that comes to mind is recreational/game activities. At the same time, the participants also emphasised the necessity of using a qualified school garden for learning-teaching and social purposes. Similarly, Yıldırım & Özyılmaz Akamca (2017) state in their study that children should interact with the resources of the natural environment, such as animals, plants and soil, and that outdoor environments should be integrated into education. Khan (2012) also states that open-air environments in primary schools will contribute positively to both the development of social-sensory abilities and learning. In short, according to the participants' opinions, an ideal school garden should not only be an environment where the child will play but also have a multifunctional use that offers the opportunity to learn and socialise. In this case, qualified school gardens in the study, intertwined with nature, containing green areas, a rich spatial diversity that can meet the characteristics and needs of different users, and other types of equipment are defined as environments.

Although there is no standard practice or study in our country regarding the outdoor classroom, which is the main subject of the study, the participants expressed the idea that outdoor classrooms would have positive effects on the cognitive, psychomotor, affective, and social development of users by generating ideas or as the basis of sample projects abroad. Khan (2012) also argues in his research that school gardens, which contain the spatial arrangement and functionality of different elements, can offer exciting and multifunctional environments to their users when combined with sensory stimulation and aesthetic quality and that a well-designed outdoor learning environment will support the development of the child in many ways. In addition, in cases such as the COVID-19 pandemic, which has affected our lives in recent years, or the natural disaster experienced by our country, which is in an earthquake zone, open-air classroom environments can be a solution for the healthy continuation of education.

Considering the opinions of both teachers and designers on the characteristics that an ideal outdoor classroom should have and the information obtained from the literature, sample design models have been tried to be developed within the scope of the study on outdoor classrooms.



Figure 1. Schoolyard design

In an idealised school garden with the findings of the study (Figure 1), Priority has been given to the fact that it does not consist of a large hard floor area; instead, it is supported with equipment that will help students' exploration read books, grow plants, green spaces, and support the development of children. In the designed garden, cover elements that can be used for four seasons and that can be transformed are used. With the lawn seating elements created in the garden, storage facilities were

provided, allowing students to store their materials. In addition, together with individual games, playgrounds that enable group work are designed.



Figure 2. The designed outdoor classroom

In the designed outdoor classrooms, the classroom, which allows storing solar energy with its semi-open top cover element, is closed, when necessary, with the screens inside and made suitable for weather conditions and classes with a climate-appropriate design (Figure 2). In the open-air class, different, within the scope of reinforcement theme, Removable-mountable modular blocks with wooden materials, which can be transformed, which are not structured, and can be used according to the child's needs, are used to develop the child's creativity.

The second model study connects the green area with transitions in the school garden on the hard ground. A shaded area was created for the children with the wooden structured cover element placed in the garden area and the sitting logs designed from the same material (Figure 3).



Figure 3. Second model school garden image

In the second model study, an outdoor classroom with indoor and outdoor connection was designed on both the ground floor of the education building (Figure 4). The open-air classroom, attached to the school building, is designed aesthetically in an integrated form with the structure. At the school, which is intended to be semi-open, openings created with different shapes and corridors that provide airflow are made on the side facades to allow seasonal uses.



Figure 4. Modelling of the outdoor classroom associated with the school building

In the designed open classroom, a layout was created with intelligent boards, seating units fixed to the floor and equipment that can be converted according to needs (Figure 5). The equipment placed in the classroom has been designed with a transformable feature consisting of unstructured, detachable modular blocks that improve the child's creativity. The setting unit transforms into a conversation area that is accessed by steps. A fun abacus area has been placed across the classroom for instructors and students.



Figure 5. Outdoor classroom interior image

In the school garden design, where the two sample models, designed in the light of the findings obtained as a result of the study, meet on common denominators, supporting the challenging ground areas with green texture has been determined as the priority criterion. The finding that green places are almost non-existent in the school gardens, and the users' access to the existing green areas is blocked or prohibited, has been reconsidered in case studies with large grass areas and appropriate plant design. School gardens have been arranged where students can relax, read books, grow plants, socialise, explore, and learn by experience. The designed exemplary outdoor classrooms are supported with flexible cover elements that can be adapted to weather conditions, and noise isolation is provided by preventing distractions in the garden area. The equipment used in the open classrooms consists of detachable modular blocks supported by natural material wood, allowing use according to the needs of children. The open-air classrooms associated with the ground floor classroom were modelled in the school garden area, with the model sampling independent of the school building.

Alternative education models for children in nature and outdoors have gained much more importance, especially recently. In today's urbanised environment, it is necessary to identify the application potentials of improved models of school gardens and outdoor classrooms. The atmosphere in which children live also plays a significant role in raising children who will be the architects of our future as individuals who are strong both physically and spiritually. It is undeniable that school gardens, where children spend most of their time, play an essential role in children's

mental and physical development, especially with increasing environmental problems and decreasing green spaces in urban areas. In addition, the vulnerability of a built education system around closed education has been revealed recently, with the COVID-19 epidemic experienced worldwide and the earthquakes in our country that had devastating consequences in 11 provinces. With the COVID-19 epidemic, schools ended face-to-face education to reduce the spread and prevalence of the virus, schools damaged in the earthquake were closed to education, and students and teachers had to switch to 'Distance Education'. In this context, open-air classes will contribute positively to the physical and mental health of the students as an alternative. Public and private schools should be encouraged to hold outdoor courses and incorporate classes into their official curricula.

Acknowledgements and Information Note

The article complies with national and international research and publication ethics. Ethics committee approval in the study, Ethics Committee of the University of Recep Tayyip Erdoğan dated 14/03/2023 was taken with the decision no. 2023/04.

Author Contribution and Conflict of Interest Declaration Information

All authors contributed equally to the article. There is no conflict of interest.

References

- Aksoy, A. (2021). Examination of qualifications of primary school gardens: The case of Adana city (Master's Thesis, Çukurova University). Accessed from Ulusal Tez Merkezi Access Address (12.10.2023): <https://tez.yok.gov.tr/>
- Akpınar, A. (2016). How is high school greenness related to students' restoration and health? *Urban For. Urban Green.* 16, 1–8.
- Almon, J. (2013). Adventure- The Value of Risk in Children's Play. Ithaca, NY: Alliance for Childhood.
- Altman, I. & Wohlwill, J. F. (1978). Children and Environment. New York: Plenum Press.
- Atabay, S. (2014). The Effect of Space and Architecture on Success in Education. Access Address (12.10.2023): <https://tedmem.org/yazilar-detay/mekan-ve-mimarinin-egitimde-basariya-etkisi>.
- Aydın Türk, Y., Yılmaz Bayram, Z., Karadeniz, B., Topaloğlu, G. & Özyavuz, A. (2018). Investigating the spatial qualifications of school area and garden. *International Journal of Scientific and Technological Research*, 4(6).
- Baltacı, A. (2018). A conceptual review on sampling methods and sample size issues in qualitative research. *Bitlis Eren University Social Science Journal*, 7(1), 231– 274.
- Başar, M. A. (2020). School location situations and facilities in school gardens of primary and secondary schools. *Journal of Original Studies*, 1(2), 61-84.
- Berk, L. E. & Winsler, A. (1995). Scaffolding Children's Learning: Vygotsky and Early Childhood Education. Washington: National Association for the Education of Young Children.
- Bitsch, V. (2005). Qualitative research: A grounded theory example and evaluation criteria. *Journal of Agribusiness*, 23(1), 75-91.
- Blair, D. (2009). The Child in the Garden: An Evaluative Review of the Benefits of School Gardening. *The Journal of Environmental Education*, 40(2): 15–38.
- Bogenç, Ç. (2021). The role of environmental education in the development of nature awareness in individuals. *J. Human. Tour. Res.* 11 (2), 408–419.
- Bogner, F. X. (1998). The influence of short-term outdoor ecology education on long-term variables of environmental perspective. *The Journal of Environmental Education.* 29(4), 17-29.

- Bohling, V., Saarela, C. & Miller, D. L. (2010). This Would Never Have Happened Indoors: Supporting Preschool-Age Children's Learning in A Nature Explore Classroom in Minnesota. MN: Dimensions Educational Research Foundation.
- Burnett, V. L. (2021). Middle School Students' Perceptions of Outdoor Classrooms for Science Learning Doctoral dissertation, University of Missouri--Columbia.
- Chawla, L. (1999). Life paths into effective environmental action. *The Journal of Environmental Education*, 31(1), 15–26.
- Constable. (2012). *The Outdoor Classroom Ages 3–7: Using Ideas from Forest Schools to Enrich Learning*. Abingdon: Routledge.
- Cosco, N. G., Moore, R. C., & Islam, M. Z. (2010). Behaviour mapping: A method for linking preschool physical activity and outdoor design. *Medicine & Science in Sports & Exercise*, 42(3), 513-519.
- Creswell, J. W. (1994). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. California: Sage Publications.
- Davies, R. & Hamilton, P. (2018). Assessing learning in the early years outdoor classroom: Examining challenges in practice. *Education 3-13*, 46(1), 117–129.
- Dennis, Jr. S. F., Wells A. & Bishop, C. (2014). A Post-Occupancy Study of Nature-Based Outdoor Classrooms in Early Childhood Education. *Children, Youth and Environments*, 24(2): 35–52.
- Eick, C. J. (2012). use of the outdoor classroom and nature-study to support science and literacy learning: a narrative case study of a third-grade classroom. *Journal of Science Teacher Education*, 23(7), 789-803.
- Fägerstam, E. & Blom, J. (2013). Learning biology and mathematics outdoors: effects and attitudes in a swedish high school context. *Journal of Adventure Education & Outdoor Learning*, 13(1): 56-75.
- Guba, E. G. & Lincoln, Y. S. (1994). Competing Paradigms in Qualitative Research. *Handbook Of Qualitative Research*, 2(105), 163–194.
- House, B. (2018). What Is the Rationale and A Design For An Outdoor Classroom For Grades Five Through Eight? Master's Thesis, USA: Hamline University.
- Ilgar, M. Z. & Ilgar, S. C. (2013). Grounded theory as a qualitative research design. *Çekmece Journal of Social Sciences*, 2(3), 197-247.
- Jordet, A. N. (1998). *Nærmiljøet som classroom: Uteskole I teori og praksis [The Nearby Surroundings as Classroom: Outdoor Education in Theory and Practice]*. Oslo: Cappelen akademisk forl.
- Kaplan, Z. (2020). The Effect of Outdoor Games on the Academic Achievement of Primary School Students. *Master's Thesis, Istanbul: Yıldız Technical University*.
- Karaburun, A., Demirci, A., & Emin, S. A. K. A. (2015). Spatial assessment of the schoolyards in the european side of istanbul: A sufficiency analysis based on the number of students. *Marmara Coğrafya Dergisi*, (31), 20-47.
- Khan, M. (2012). *Outdoor As a Learning Environment for Children at A Government Primary School in Bangladesh* (B.Arch. Thesis, Bangladesh University of Engineering and Technology). Accessed from [Academia.edu](https://www.academia.edu/13637806/Outdoor_as_learning_environment_for_children_at_a_primary_school_of_Bangladesh) zAccess Address (12.10.2023): https://www.academia.edu/13637806/Outdoor_as_learning_environment_for_children_at_a_primary_school_of_Bangladesh
- Khan, M., McGeown, S. P. & Islam, M. Z. (2019). There is no better way to study science than to collect and analyse data in your yard': Outdoor classrooms and primary school children in Bangladesh. *Children's Geographies*, 17(2), 217–230.

- Kiewra, C. & Veselack, E. (2016). Playing with nature: Supporting preschoolers' creativity in natural outdoor classrooms, *International Journal of Early Childhood Environmental Education*, 4(1), 70-95.
- Kuo, F. E. & Faber Taylor, A. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: evidence from a national study. *American journal of public health*, 94(9), 1580–1586.
- Largo-Wight, E., Guardino, C., Wludyka, P. S., Hall, K. W., Wight, J. T. & Merten, J. W. (2018). Nature contact at school: The impact of an outdoor classroom on children's well-being. *International journal of environmental health research*, 28(6), 653–666.
- Louv, R. (2010). *Last Child in the Woods: Saving Our Children from Nature-deficit Disorder*. New York: Algonquin Books.
- Malone, K. & Tranter, P. J. (2003). *Children's Environments: A Study of Children's Environmental Learning concerning their Schoolground Experiences*. Melbourne, Victoria: RMIT University.
- Marczyk, G., DeMatteo, D. & Festinger, D. (2005). *Essentials of Research Design and Methodology*. New York: John Wiley & Sons Inc.
- Mårtensson, F., Boldemann, C., Söderström, M., Blennow, M., Englund, J. -E. & Grahn, P. (2009). Outdoor Environmental Assessment of Attention-Promoting Settings for Preschool Children. *Health & Place*, 15(4), 1149-1157.
- McCurdy, L. E., Winterbottom, K. E., Mehta, S. S. & Roberts, J. R. (2010). Using Nature and Outdoor Activity to Improve Children's Health. *Current Problems in Pediatric and Adolescent Health Care*, 40(5), 102–117.
- Merriam, S. B. & Tisdell, E. J. (2016). *Qualitative Research: A Guide to Design and Implementation*. (Fourth Edition). San Francisco: John Wiley & Sons, Inc.
- Milteer, R. G. & Ginsburg, K. R. (2012). Council on Communications and Media & Committee on Psychosocial Aspects of Child and Family Health (2012). The importance of play in promoting healthy child development and maintaining strong parent-child bond: Focus on children in poverty. *Pediatrics*, 129(1), e204-e213.
- Milton, B., Cleveland, E. & Bennett-Gates, D. (1995). Changing perceptions of nature, self, and others: a report on a park/school program. *Journal of Environmental Education*, 26(3), 32–39.
- Morton, T. (2017). *Human Kind: Solidarity with Non-Humans*. Istanbul: Verso Books.
- Myhre, T. S. & Dewaele, J. M. (2022). Outdoor teaching as an alternative to emergency remote teaching during the COVID-19 Pandemic. *The European Educational Researcher*, 5(2), 129-132.
- Nelson, E. (2012). *Cultivating Outdoor Classrooms: Designing and Implementing Child-Centered Learning Environments*. MN: Redleaf Press.
- Nundy, S. (1999). The Fieldwork Effect: The Role and Impact of Fieldwork in The Upper Primary School. *International Research in Geographical and Environmental Education*, 8(2), 190–198.
- Onat, O. (2011). *A Qualitative Research to Examine the Moral Identities of Young Adults* (Doctoral Thesis, Marmara University). Accessed from Ulusal Tez Merkezi Access Address (12.10.2023): <https://tez.yok.gov.tr/>
- Pürlüsoy, İ. & Elibol, G. C. (2022). Investigation of Spatial Needs in Primary School Education Spaces in Terms of Educational Approaches. *Journal of Architectural Sciences and Applications*, 70(1), 189–208.
- Rickinson, M., Dillon J., T. K., Morris M., Y. Choi M., Sanders, D. & Benefield, P. (2004). *A Review of Research on Outdoor Learning*, Shrewsbury, UK: Field Studies Council.
- Rothenberg, J. (1989). The Open Classroom Was Reconsidered. *The Elementary School Journal*, 90 (1), 68-86.

- Safi, S. (2022). *Research on the Designs of Primary School Gardens in Urban Areas* (Master's Thesis, Işık University). Accessed from Ulusal Tez Merkezi Access Address (12.10.2023):<https://tez.yok.gov.tr/>
- Samborski, S. (2010). Biodiverse or barren school grounds: Their effects on children. *Children, Youth and Environments*, 20(2): 67-115.
- Saygın, D. & Güneş, D. Z. (2023). Examination of primary school gardens in terms of natural elements and children's physical development. *Journal of Human and Social Sciences Research*, 12(1), 121-150.
- Schäffer, S. D. & Kistemann, T. (2012). German forest kindergartens: healthy childcare under the leafy canopy. *Children, Youth, and Environments*, 22(1): 270-279.
- Shenton, A. K. (2004). Strategies For Ensuring Trustworthiness in Qualitative Research Projects. *Education for information*, 22(2), 63-75.
- Shield, B. & Greenland, E.J. (2010). Noise in open plan classrooms in primary schools: A Review. *Noise&Health*, 12 (49), 225-234.
- Stan, I. & Humberstone, B. (2011). An ethnography of the outdoor classroom: How Teachers manage risk in the outdoors. *Ethnography and Education*, 6 (2), 213–228.
- Towell, J. L. (1997). *Quality Outdoor Preschool Environments in Early Care and Education Centres* (Master's Thesis, Oklahoma State University). Accessed from ShareOK Access Address (12.10.2023):https://shareok.org/bitstream/handle/11244/9141/Towell_okstate_0664M_1573.pdf?sequence=1. Accessed 21 June 2023.
- Vural, H. & Yılmaz, S. (2018). Physical Adequacy of Erzurum City School Gardens. *Turkish Journal of Agriculture and Natural Sciences*, 5(2), 109-120.
- Waldron, J. W. F., Locock, A. J. & Pujadas-Botey, A. (2016). Building an outdoor classroom for field geology: The Geoscience Garden. *Journal of Geoscience Education*, 64(3), 215-230.
- Waller, T. & Arlemalm-Hagser, A. & Sandseter, E. B. H. & Lee-Hammond, L. & Lekies, K. & Wyver, S. (2014). *The SAGE Handbook of Outdoor Play and Learning*. SAGE Publications.
- Wells, N. (2000). At Home with Nature: Effects of "Greenness" on Children's Cognitive Functioning. *Environment and Behavior*, 32(6):775–795.
- Wells, N. M. & Evans, G. W. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior*, 35(3), 311-330
- Wood, D. & Middleton, D. (1975). A study of assisted problem-solving. *British Journal of Psychology*, 66(2), 181–191.
- Yaman, M. (2005). *The Open-Air Classroom: A Preliminary Study of Outdoor Classrooms for Primary Schools in Malaysia*. (Doctoral Dissertation, Australia: University of Tasmania).
- Yıldırım, A. & Şimşek, H. (2008). *Qualitative Research Methods in The Social Sciences* (6th Edition). Ankara: Seçkin Publishing.
- Yıldırım, G. & Özyılmaz Akamca, G. (2017). The Effect of Outdoor Learning Activities on The Development of Preschool Children. *South African Journal of Education*, 37(2) 1-10.
- Yılmaz, S., Vural, H. & Yılmaz, H. (2023). Effects of botanical gardens on student environmental perception. *Ecological Informatics*, 73, 101942.
- Yılmaz, O. & Ertürk, F. (2016). A Research on the Adequacy of School Gardens Among Public Open Green Spaces in Çanakkale City Center. *Çanakkale Onsekiz Mart University Institute of Science and Technology Journal*, 2(2), 45-55.

