

**PROCEEDINGS BOOK**

**ICNTAD CONFERENCE**

**INTERNATIONAL CONFERENCE ON NEW TRENDS  
IN ARCHITECTURE AND INTERIOR DESIGN**

**5<sup>th</sup> International Conference on New  
Trends in Architecture and Interior Design**

# **ICNTAD** CONFERENCE

INTERNATIONAL CONFERENCE ON NEW TRENDS  
IN ARCHITECTURE AND INTERIOR DESIGN

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## ICNTAD'2019

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***Dear Colleagues,***

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- Intangible skin of space: lighting design
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- Ideology in architecture / Ideology of architecture
- Spaces without space: 3D virtual spaces
- The math of space: spatial analysis and parametric design
- The artistic value of space
- Architecture without architect
- Cultural codes in architecture
- Flexibility in design
- New trends in spatial design education

The most distinctive feature of 5th ICNTAD’19 from other conference organizations is that the academicians working interdisciplinary can also attend to presentations performed in different specialty fields and they will also have the opportunity to meet with other academicians coming from various parts of the world. On the same dates, International Conference upon the discipline of Clean Energy will be also be held in the same venue. While attending 5th ICNTAD’19, participants are most welcome to attend other conferences.

We kindly wait for your attendance to our conference to be held on April 26 – 28, 2019, with a hope to realize a satisfactory conference with its social activities as well as the scientific ones and leaving a trace on your memories.

Regards

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## 5<sup>th</sup> International Conference on New Trends in Architecture And Interior Design

DIGITAL TRANSFORMATION IN CONTEMPORARY ART MUSEUMS WITH THE EXAMPLE OF BARCELONA MUSEUM OF CONTEMPORARY ART .....	
<i>Gamze KARAYILANOĞLU</i> .....	16
ADAPTIVE REUSE IMPLEMENTATIONS OF ABANDONED INDUSTRIAL AREAS: EXAMPLE OF ZURICH-WEST .....	
<i>Ceren ÇELİK, Gamze KARAYILANOĞLU</i> , .....	21
REVIEWING CURRENT PRACTICES AND STUDIES IN MUSEUM AND GALLERY LIGHTING .....	
<i>Aslıhan ÇEVİK, Tuğçe KAZANASMAZ</i> , .....	27
A NEW APPROACH TO THE TRANSFORMATION OF MUSEUMS .....	
<i>Merve KALYONCUOĞLU, Elif GÜNEŞ</i> .....	33
WEARABLE ARCHITECTURE_A DESIGN OF A DEPLOYABLE SPACE .....	
<i>Meltem Büşra ÖNAL, Erhan KARAKOÇ</i> .....	39
PERFORMATIVE ARCHITECTURE: A CASE STUDY ON DESIGNING A SPACE FOR AN ARTISTIC PERFORMANCE .....	
<i>Yeşim OKUR, Erhan KARAKOÇ</i> , .....	49
QUESTIONING THE PHENOMENOLOGICAL UNDERSTANDING THROUGH ARCHITECTURAL SPACES .....	
<i>Nesil AFŞİN</i> .....	60
EXPERİENCE OF SPACE, PLACE AND IDENTİTY AS CONCENTRİC ORGANİZATİON: THE ISLAND CITY FAMAGUSTA .....	
<i>Cansu Denizhan</i> .....	69
INDUSTRIAL BUILDINGS TRANSFORMED; THE IMPACT OF FORM AND FUNCTION IN THE ADAPTIVE REUSE PROCESS .....	
<i>Tochukwu NNAJI, Kağan GÜNÇE, Hacer BAŞARIR</i> .....	76
CHANGING ROLE OF INSTRUCTOR IN CONTEMPORARY EDUCATIONAL APPROACH: BLENDED LEARNING EXPERIMENT IN INTERIOR ARCHITECTURE EDUCATION .....	
<i>Fatemeh DOLATYARI AZAR, Nil PAŞAOĞLULARI ŞAHİN</i> .....	86
EXPLORİNG INTERIOR SPACE ATMOSPHERE: LOFTS THROUGH LENSES OF INTERIOR SENSİBILITY WITHIN ARTİSTİC VALUE .....	
<i>Zehra Babutsalı Alpler, Nil Paşaoğlulari Şahin</i> .....	92
RE-ESTABLISHING THE “HOME”: A CASE ON SYRIANS IN TURKEY .....	
<i>Talia ÖZCAN AKTAN, Özge CORDAN</i> .....	104

A NEW TOOL FOR INTERIOR ARCHITECTURE STUDENTS .....	
FOR SENSING THE SPACE AND VISUAL THINKING .....	
<i>Genco BERKİN</i> .....	115
NEW TRENDS IN ARCHITECTURAL COMPETITIONS .....	
<i>Mateja KATRAŠNIK</i> .....	119
EVALUATING THE PHYSICAL ENVIRONMENT OF ECOLOGICAL KINDERGARTEN BASED ON THE REQUIREMENTS OF EARLY ENVIRONMENTAL EDUCATION: A CASE STUDY IN DÖŞEMEALTI, ANTALYA .....	
<i>Shirin IZADPANAHA, Poupak PARVARESH, Yaren ŞEKERCİ</i> .....	132
ARCHITECTURAL QUALIFICATIONS OF ICONIC BUILDINGS.....	
<i>Burcu KÖSE KHIDIROV, Hatice AŞKIN, Tülay TUNCAY, Feyza Nur DİŞKAYA</i> .....	141
EGYPTIAN BAZAAR IN THE CONTEXT OF SPACE AND TASTE RELATIONSHIP .....	
<i>Feyza Nur DİŞKAYA, Tülay TUNCAY, Hatice AŞKIN, Burcu KÖSE KHIDIROV</i> .....	149
THE ROLE OF CULTURAL HERITAGE IN SMART CITY CONTEXT .....	
<i>Diala Atiyat,</i> .....	156
THE FUTURE OF ECO-CITIES: A COMPARISON OF EPHESUS ANCIENT CITY WITH MASDAR CITY .....	
<i>Hasan KALWRY, Cemil ATAĞARA</i> .....	162
SUSTAINABLE URBAN AND CULTURAL PHENOMENON IN VERTICAL GROWTH..	
<i>Cemil ATAĞARA, Cem DOĞU</i> .....	171
ARCHITECTURE WITHOUT ARCHITECTS - SUSTAINABLE DESIGN OF A VERNACULAR BOSNIAN STONE HOUSE.....	
<i>Maida Halilović</i> .....	177
CRITICISING (UN)SUSTAINABLE SKYSCRAPERS:THE CASE OF FOLKART TOWERS .....	
<i>Aynur GÜNDÜZ, Kutluğ SAVAŞIR</i> .....	188
SUSTAINABLE EDUCATIONAL BUILDINGS IN ACADEMIC STUDIES IN TURKEY ...	
<i>Gizem EROL, Hikmet GÖKMEN</i> .....	200
A CRITICAL DESIGN METHOD TO RECONSTRUCT THE HISTORICAL CENTER OF ALEPPO.....	
<i>Selcen SÖZÜNERİ</i> .....	206
MEMORY AND ART READING ON 'FINDIKLI PARK' .....	
<i>Saadet Kök İpek Akpınar Aksugür</i> .....	216
READING CULTURAL CODES IN MULTIPLE LAYERED PLACES: PERGAMON .....	
<i>Elif Ceren TAY, Çiğdem CANBAY TÜRKYILMAZ,</i> .....	225

CONSIDERATIONS ON THE UNFINISHED AS THE OUTCOME OF ARCHITECTURAL RESTORATION PROJECTS.....	
<i>Enrico PIETROGRANDE, Andreina MILAN</i> .....	234
MASS CUSTOMIZATION IN INTERIOR DESIGN VIA INTERACTIVE DIGITAL INTERFACES.....	
<i>Burçin Cem ARABACIOĞLU</i> .....	242
MESSAGES OF VENUE HEIGHTS AND NATURAL LIGHT USE TO THE USER- A REVIEW OF ANCIENT EGYPTIAN TEMPLES .....	
<i>Didem ERTEN BİLGİÇ, Esra ABDELHAMİD HOSNY</i> .....	247
USING THE “CONCEPTUAL DESIGN CODES” IN DESIGN EDUCATION: ARCHITECTURAL DESIGN STUDIO EXAMPLES .....	
<i>Aysun AYDIN ÖKSÜZ, Bahar KÜÇÜK KARAKAŞ, Gizem SEYMEN</i> .....	255
THE USE OF AUGMENTED REALITY (AR) IN SPATIAL DESIGN EDUCATION .....	
<i>Zeynep GÜLEL, Burçin Cem ARABACIOĞLU</i> , .....	265
TRANSITION OF CONTEMPORARY CAFES TO SOCIAL VENUES: “HUQQABAZ CAFE” .....	
<i>Merih KASAP, Şebnem ERTAŞ</i> , .....	273

# EVALUATING THE PHYSICAL ENVIRONMENT OF ECOLOGICAL KINDERGARTEN BASED ON THE REQUIREMENTS OF EARLY ENVIRONMENTAL EDUCATION: A CASE STUDY IN DÖŞEMEALTI, ANTALYA

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## Abstract

In recent years, Early Childhood Education has been widely influenced by ecological approaches and sustainable design. The reason for that could be named as the increasing number of studies which claim to invest on promoted awareness of young children towards the natural environment which has roots early childhood education. Environmental education in early childhood is a holistic concept that encompasses knowledge of the natural world parallel with developing children's emotions, dispositions, and skills. The current study is tracking the architectural features of a newly built ecological kindergarten in Antalya, Turkey that has adopted environmental education to explore its compatibility with the NAAEE guideline for Early Childhood Environmental Education Programs. The methodological approach of this study contains a detail site-analysis, physical environment of the so-called ecological kindergarten, as well as the profound questionnaires for teachers and parents to share their ideas related to the weaknesses and strengths of the physical environment of the kindergarten. Comparing the data collected from the questionnaires with the one from the observation survey, this study concludes that the outdoor space of the kindergarten is more compatible with environmental education. While the architectural features of the ecological kindergarten do not meet the approved requirements of an ecological design, this design approach promotes a noticeable development on the environmental education of the neighborhood and its surrounding.

**Key Words:** *Kindergarten, Physical Environment, Architectural Features, Early Environmental Education, Nature-Oriented*

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## 1. Introduction

Respecting and protecting nature has become societies main concerns, and therefore many different professions and industry are developing new strategies to support this concern. Early Childhood Education is one of these industries. Many initial childhood settings around the world have started to create an environment and educational system that would increase the children's awareness of their impact on the environment and ways to minimize it. According to Kahn (2002), encouraging children to be involved with nature will last a lifetime, and since modernization has removed the new generation from the natural environment, childcare centers, kindergartens, and preschools can set the world on more sustainable pathways in the future by educating children about the importance of nature and environment.

Richard Louv (2008), an author best known for his study of children's current and historical relationship with nature, identified "time" and "fear" as the barriers between children and natural environment. The time factors that decrease children's direct exposure to nature are the parents' schedule, children's schedule, and electronic devices. Louv argued that "time in nature is not leisure time; it's an essential investment in our children's health" (p. 120). Some researchers have claimed the crucial role of nature in children's well-being. Faber Taylor and Kuo (2006) has argued that outdoor activities in natural environments improve children's social and cognitive development and Kellert (2005) has claimed natural environment increases children's stimulation and as a result, encourage them to engage in more learning opportunities. Nature is now considered as a broad classroom which provides opportunities for children for better development in social, cognitive and learning skills (Fitzgerald, 2018), and therefore the number of kindergartens and childcare that adopt nature-oriented education is increasing.

"In Scandinavia, children attending nature nursery schools experience a complete immersion in the forest as their outdoor play space. In Australia, some early childhood centers have recognized the importance of nature for children and created nature-based outdoor play spaces (Davis & Elliott, 2004)". A survey in 2017 by NAAEE established that 250 nature preschools and forest kindergartens are operating across U.S. Eco Farm Kindergartens (EFK) is another innovative project that focuses on enhancing active eco-farming activities. Seven countries (Estonia, Italy, Lithuania, Norway, Portugal, Romania and Turkey) are involved in this project (URL 1).

Kindergarten that has adopted the content of EFK project in Turkey is ecological kindergarten which is located in Döşemealtı, Antalya. This kindergarten takes an educational system in which children are getting involved with nature in most of their daily routine. This kindergarten has started education in the middle of September 2017-2018. With the establishment of this kindergarten, request for nature-friendly education has

increased among the parents, and interestingly in a brief time, many other kindergartens in surrounding have started to include the nature-friendly activities in their slogans and social media.

Although the concept of this kindergarten has increased the local awareness on including nature-friendly activities in early education, it is also essential to learn if the physical environment of the kindergarten provides the requirements for nature-friendly education and activities. Environmental education in early childhood is a holistic concept that encompasses knowledge of the natural world as well as emotions, dispositions, and skills and therefore, the current study aimed to evaluate the physical environment of this kindergarten based on the requirements of space Early Childhood Environmental Education Programs.

In this research 'Guidelines for Excellence, Early Childhood Environmental Education Programs' is adopted as the primary resource and items that are defined in this guideline as the main keywords for providing an excellent space and place for early environmental education are used as evaluation checklist. The physical environment of the kindergarten is evaluated according to the established checklist, and later teachers and parents have participated in the questionnaire survey to share their ideas about the physical environment of the kindergarten. Data collected both stages of research has compared and interpreted, and the strength and weakness of the architectural design of the kindergarten have been defined accordingly.

## 2. Review of the Literature

*"If schools do not undergo radical reform, they will simply cease to exist as the primary source for 'education.'" (Nair, 2000)*

An expanding body of studies entitled the early childhood years as the prominent periods of one's life, upon which the rest of the life is constructed, developed and progressed (Rutter 2002, Mustard 2000, Davis 1998). Early environment experiences have been positively associated with the improvement of imagination and curiosity, two essential motivators for lifelong learning. Some studies indicated that the initial perception of the human-nature relationship is partially constructed and complete during early childhood stages (Phenice & Griffore 2003). By providing an inviting, comfortable setting in the early stages of life, children can enhance the sense of connectedness with the natural world and consequently attachment to it. (Cobb 1977, Wilson 1996, Wilson 1996, Louv 1991, Altman & Wohlwill 1983).

Accordingly, there is an international awareness growing towards the importance of early environmental learning and its impact on the environmental-friendly behavior of children later in life, the sociocultural and also the economic advancement of communities and nations (Alp et al. 2008; Hungerford & Volk 1990; Hines et al. 1986). Exposing to an environmentally friendly setting in early childhood may help to obtain a fundamental understanding of the environment with its associated problems. Additional studies have mentioned early childhood outdoor recreational experiences as playing an essential part of the formation of environmental behavior. (Ewert et al. 2005, UNESCO-UNEP 1991). However, different studies have declined a strong relationship between ecological knowledge and environmental-friendly behavior (Alp et al. 2008, Makki, et al. 2003, Kuhlemeier et al. 1999).

Numerous studies have indicated the crucial role of the child's environment in the early environment education where the setting is offering opportunities for exploration and experiment. On the process of a child's physical, social and cognitive development, the physical environment is addressed as the 'third educator,' alongside the teachers and educational program. Such indication clarifies the critical role of the physical environment on early environmental learning where a design offers proper access to the natural settings (Berris & Miller 2011; Moore & Sugiyama 2007, Moore 1987). An essential part of early environmental education is the design of the interior (e.g., rooms size, rooms layout, and lighting) as well as the exterior (e.g., outdoor spaces, nature, play equipment) of the physical environment where children can improve learning and development skills (Evans 2006).

By offering active and passive play places at different angles and levels, as well as open and closed spots, children not only would encourage to explore and, experience the environment but also would participate in social exchanges to develop the identity and a sense of self-worth (Berris & Miller 2011, Malone et al. 2003).

For a long, the physical environment of early childhood education centers has been seen only as places where the school is 'kept,' and just by the end of the 1980s have been addressed as places that can directly support or restrain learning. By the beginning of the 1990s, innovative buildings were designed and introduced concepts of sustainability, disability movement, use of green materials, micro-climates and fuel-efficient approaches to pre-school educational buildings (Clark 2002).

*"It might be speculated that in some schools the physical environment may not be a necessary condition of effective learning ... [however] a key component in the strategy for improvement has been the close attention paid to the physical environment" (National Commission on Education 1996).*

Most of the studies on early environmental education, addressed the importance of the link between the interior and exterior environments, natural playgrounds, accessible green areas, wide openings and efficient access to solar energy and natural daylighting for children (Dudek 2000, Wilson 1994, Gaylord 1987).

Still, there are relatively limited studies that have focused comprehensively on the role of the physical environment of early childhood centers and the impact of interior and external space design. The failure of studies on the architecture of early childhood educational buildings has conducted to neglect the fact that schools are physical entities as well as organizational units (Jamieson et al. 2000). This inadequacy of interest in the relationship between physical place and learning process has contributed to the mismanagement of specific areas of the schools such as seating arrangements and classroom layouts. Further, the importance of educational space regarding its size, location, and layouts in affecting social interaction between students and teachers has to be widely examined (Wasley 2000).

The gap in the literature regarding the architecture of early environmental education centers contributed to understanding the critical need for such studies. Considerately, this study carries out a profound physical characteristic's analysis of an ecological kindergarten as an outstanding concept in early childhood environmental education. The strengths and weaknesses of the physical environment the strengths and weaknesses of the physical environment will take into the account and may grant the suggestions for improving the physical environment of such entities in future research.

### 3. Methodology

This study is established through two stages of data collection. In the first stage, the aim was evaluating the appropriateness of the kindergarten's physical environment in responding to the requirements of early environmental education. Consistent with this purpose, an evaluation checklist has been developed based on the 'Early Childhood Environmental Education Programs: Guidelines for Excellence' (NAAEE, 2010) and the physical environment of the kindergarten was evaluated accordingly in several visits. During the checklist evaluation, teachers and staff were also engaged where it was necessary to collect proper and reliable data. Each item of the checklist has been rated as either weak, strong or moderate (checklist and its implementation method are included in the appendix). At the end of this stage number of weak items, successful items and moderate items were classified, and the strength and weakness of the physical environment have identified accordingly.

In the second stage, the aim was learning the strength and weaknesses of physical environment from teachers' and parents' point of view to see if they would mention other subjects that have not already considered in checklist evaluation. Based on this intention, all teachers and 50% of parents have participated in a questionnaire survey. Data collected from both groups of participants were analyzed and similar and different answers were classified to identify the weaknesses and strengths of the physical environment for parents and teachers. At the end of the second stage, the results of the checklist and results from the questionnaire survey were compared and strong and weak features of the physical environment have established accordingly. At this point, some additional items were also suggested to be included in the evaluation checklist.

### 4. Findings

In the first stage of research, the physical environment of the Ecological Kindergarten was evaluated using a checklist that has been built during several visits (Appendix I). In the course of these visits staff and teachers were engaged in the evaluation of the physical environment that contributes to achieving consistent data. 'Spaces and places to enhance development' was the first critical characteristics for such an assessment. kindergarten in general rates highly effective in response to the six items of this list yet fails to address the rest five (Table 1).

Table 1. Evaluation of the spaces and places to enhance development in Ecological Kindergarten

1. SPACES AND PLACES TO ENHANCE DEVELOPMENT		
Evaluation Items	Comments	Rating
1.1	There are no natural elements available. Instead, the garden is equipped with artificial objects in the playground.	Negative
1.2	Collecting natural pieces and materials from the garden, children created artworks. They were also constantly observing and appreciating plants growing as well as petting animals kept in the yard.	Positive
1.3	Sensory experience: Touch: The sand pool, the soil and the plants create a touchscape for the children. They can touch a variety of organic and natural materials in a variety of activities such as cooking and science-based games. Smell: Although there is not a dominant scent at the Kindergarten teachers are using a mixture of organic ingredients to teach the smellscape. This follows by the cooking activities. Sight: Children have a full view of outdoor from all the rooms and classrooms. Also, there is complete visual access to the central garden from the corridors. Taste: While there are local fruits and vegetables available for the children, they collect the self-growth ones from the garden as well.	Positive
1.4	All learning materials are displayed in open shelves and cupboards in the classrooms.	Positive

1.5	Sprinkler, Piles, and shelves are only the materials that children can use in the yard. They are kept in storage under the supervision of teachers.	Positive
1.6	Lack of a semi-open space makes it difficult to use the outdoor spaces during the winter. Moreover, the lack of shading elements limits the use of outdoor spaces during the hot summer days.	Negative
1.7	There is no ample shade in the garden. Instead, there is an out of scale pergola to be used by children. Although having a bright sunny indoor spaces is mostly appreciated due to the transparent facade of the building, it is not responding to the climate of Antalya during hot summer days. There are no windbreaks. The teacher believes that it would be better to offer larger areas to the central garden. Children have no access to the passive spaces inside the Kindergarten as teachers do not let them be anywhere alone. Besides, due to the lack of physical spaces these spaces are used as storage for the books and gaming objects. The small gathering area is unavailable due to the built-in furniture. Art activities are happening inside the classrooms, but according to the teacher's lack passive spaces and corners did not allow them to create learning stations. There is a separate room for 'music and movement.'	Negative
1.8	There is plant all over the place, and children participate in watering them inside and outside. Children also feed the animals in the garden.	Positive
1.9	Except for the eating area, there is no other space that all the children and teachers can share. The entrance is too small, and the children cannot gather all together there.	Negative
1.10	Indoor spaces are well-defined, to entering and exit the space and the activities do not interfere with one another.	Positive
1.11	Use of soft and neutral colors in most of the rooms and classrooms prevent children from over stimulating. There is a lack of sleeping room that makes resting time a challenging phase.	Negative

Evaluating the natural components was the second step in this stage. According to the findings, Ecological Kindergarten mostly failed to respond to the evaluating criteria, which is one of the main weak points of this kindergarten regarding early environment education (Table 2).

Table 2. Evaluation of the availability of natural components in Ecological Kindergarten

2. NATURAL COMPONENTS		
Evaluation Items	Comments	Rating
2.1	There is no asphalt outdoor, and the artificial stones and tiles cover the walking paths. No natural materials are used to define the pathways.	Negative
2.2	No natural material is used in the indoor and outdoor play area.	Negative
2.3	There are loose parts and earth materials, but there is no rough ground.	Neutral
2.4	There is no water source outside. There is a pool, but it is empty due to technical problems.	Negative
2.5	There have been some human-made bird nests located in the garden, but no birds have ever lived in them. There is a Palm tree in the central garden that turned out to be a natural habitat of the birds and children visited this tree from time to time.	Neutral
2.6	There are plants located in indoor space.	Positive
2.7	Maki tree is Antalya's local Tree. There is no Maki tree inside, but there is a couple of Maki trees visible from the window in the surrounding areas. Except for the fruits, children are not exposed to any other local heritage.	Negative
2.8	Natural materials such as seasonal fruits, local organic food, and natural materials are used in hands-on activities. Due to lack of enough space entrance is mainly used to exhibit these materials. Transparent façade allow children to observe climate change through seasonal changes.	Positive

'Children's and teachers comfort' was the third characteristic that has been evaluated in Ecological Kindergarten. This characteristic was another failing regarding the early environmental education (Table 3). Based on the observations, the lack of enough space was the main reason behind most of these flaws.

Table 3. Evaluation of the children and teachers comfort in Ecological Kindergarten

3. COMFORTABLE FOR BOTH CHILDREN AND ADULTS		
Evaluation Items	Comments	Rating
3.1	There are nooks and furniture for children's interaction but and teachers have personal areas. There is a lack of a functional gathering area and children do not use the particular areas.	Negative
3.2	Sufficient seating areas are provided.	Positive
3.3	While the spaces are safe and inviting, this Kindergarten is not a barrier-free one, and physically impaired children cannot have access to the second floor. the	Negative
3.4	Only the small zoo looks adventurous, whereas the corners remain un-used and shallow.	Negative
3.5	Shading elements and wind protections are missing.	Negative
3.6	They use natural ventilation by opening windows on both sides. Transparent façade brings in natural light and keep the area warm in winter. Solar panels provide the electricity for heating and cooling.	Positive
3.7	Use of colors and soft materials together with the transparent facades make the indoor space look attractive. The Circular form of the building along with the transparent walls makes the architecture attractive.	Positive
3.8	There is not enough play area inside and outside. There is a chest area inside, but the chest is not a local play. Hide and Seek and Hopscotch are local plays which children play time to time with their teachers.	Neutral
3.9	Outdoor looks more exploratory in comparison to the interior and the adventures are more activity-based rather than physically-based.	Negative
3.10	There is storage in the garden separate from the main building for keeping the children's art crafts, and also they store natural materials in this storage. The manager and teachers believe that it would be better if they had bigger storage inside.	Negative

‘Maintenance and usability’ was one of the strong characteristics in this kindergarten and most of the necessary items were rated as positive. Lack of sustainable materials in the construction was the only weak item (Table 4).

Table 4. Evaluation of the children and teachers comfort in Ecological Kindergarten

4. MAINTENANCE AND USABILITY		
Evaluation Item	Comments	Rating
4.1	Children are using sprinklers to water the plants. Taking planting tools from the storage under the supervision of teachers, children make organic composting.	Positive
4.2	Lack of record on sustainable construction materials.	Negative
4.3	Indoor signage is appropriate and outdoor path is defined, but fences are not from natural materials.	Neutral
4.4	Appropriate items are accessible to the children via open shelves, and inappropriate things are kept out of the reach of children.	Positive
4.5	All facilities meet applicable regulatory standards.	Positive
4.6	Children clean their classrooms every Friday. They also participate in collecting their dishes and garbage after their meal and to clean the used area.	Positive

‘Health, safety and risk’ is one of the features that have successfully provided in Ecological Kindergarten (Table 5). This fundamental characteristic is very crucial because the lack of these characteristics would make the physical hazardous.

Table 5. Evaluation of health, safety and risk’ in Ecological Kindergarten

5. MAINTENANCE AND USABILITY		
Evaluation Items	Comments	Rating
5.1	Risk assessment concerning the environmental, biological, chemical, and structural hazards.	Positive
5.2	Established Americans with Disabilities Act (ADA) is not applied, but health and safety standards are followed, and a risk management plan is in place.	Negative
5.3	Emergency plans are established, shared, and understood by staff.	Positive
5.4	Outdoor activity has been emphasized by most of the parents as a positive feature of the kindergarten.	Positive
5.5	Staffs are well trained by participating in ongoing training; emergency and first aid supplies are available.	Positive
5.6	Staff members know their disposition toward risk.	Positive

In the final step of this stage ‘environmental sustainability’ of the kindergarten was evaluated. Because of the lack of sustainability concerns in designing the kindergarten, items related to this essential characteristic were mainly weak and missing (Table 6). However, Administration staff claimed that they are aware of this point and they are planning to consider that for the extended development of their branch.

Table 6. Evaluation environmental sustainability in Ecological Kindergarten

6. ENVIRONMENTAL SUSTAINABILITY		
Evaluation Items	Comments	Rating
6.1	A solution to collect the rainwater is not considered even though Antalya rains all winter. However, time to time children water the plants with the buckets that have to collect the rainwater. Children participate in gather the recycle materials. Children prepare food, Jam, and tea by using the fruits and vegetables they collect from the garden. Solar panels on the roof support the electricity of the building.	Positive
6.2	Design of the building does not meet the validation criteria for the sustainability, regarding material and layouts.	Negative
6.3	Materials are easy to clean and prevent sliding. But no other special consideration.	Neutral
6.4	Except for the solar panels, there is no other consideration that contributes to indoor sustainability.	Negative
6.5	Chemical poison used for the mouse in the garden but children access to the yard was denied at this time. No other insect emergency has reported.	Positive
6.6	Maintenance practices and supplies are not used with sustainability in mind	Negative
6.7	Rainwater is collected occasionally by using buckets.	Negative

According to the final report of checklist evaluation, weaknesses and strengths of the Ecological Kindergarten’s physical environment are as Table 7.

Table 7. Evaluation environmental sustainability in Ecological Kindergarten

Strengths	Weaknesses
- Availability of the appropriate activity areas	- Lack of natural play elements
- Providing a variety of sensory experiences	- Lack of semi-open spaces
- Accessibility of the learning areas	- Lack of enough outdoor spaces
- Availability of an outdoor storage areas	- Lack of a well-design indoor storages
- Central courtyard	- Lack of common areas
- Well-defined activity areas (Music room and cinema room)	- Failure of design in creating various active and passive adventurous spaces for children and their interaction with the environment/nature
- Integration of plants with indoor space	- Lack of a water source in outdoor
- Various comfortable seating elements	- Insufficient use of natural materials in indoor and outdoor
- Transparent façade for natural lighting	- Design solutions to collect rainwater and windshield
- Natural ventilation	- Lack of enough play area
- Availability of zoo in garden	- The inappropriate design approach for disabled users
- Solar panels	- Failure of response to the sustainability
- Safe and secure environment	

In the second stage of research, all 13 teachers and 50% of the parents (total 56 people) have participated in a questionnaire survey. In this survey, same questions related with strength and weakness kindergarten’s physical environment were asked and only in parents’ questionnaire they were also asked to mention the reason they have to choose Ecological Kindergarten. Most of the parents had similar reasons to choose this kindergarten, which categorised in the eight main keywords, represented in Chart 1. Some parents have indicated more than one answer to the question that causes the overall percentage to be over 100%.

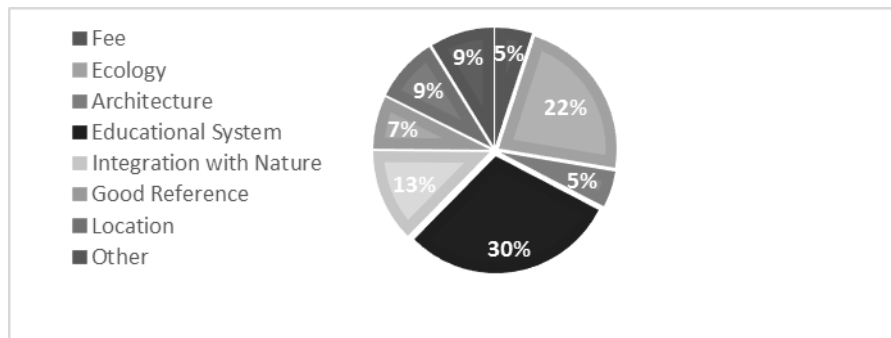


Chart 1. Parents' reasons for choosing Ecological kindergarten

Findings showed that parents mainly prefer this kindergarten because of its ecological approach and the educational system. Analyzing how the kindergarten is reflecting the environmentally friendly approach, the answers were classified in four different categories (chart 2). As some teachers and parents indicated more than one answer to the questions, the overall percentage is over 100%.

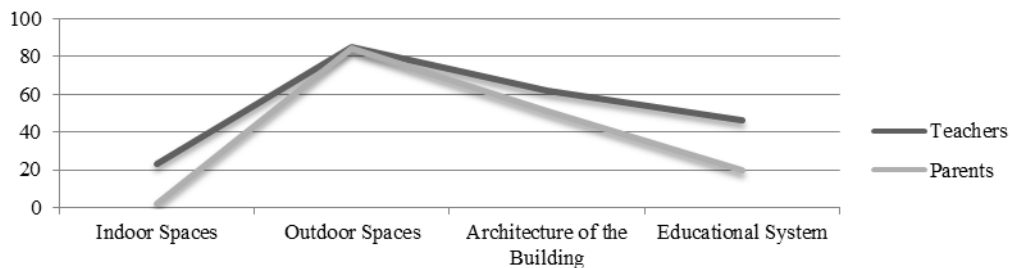


Chart 2. Features that reflect the environmentally friendly approach of Ecological Kindergarten according to teachers and parents

In another question both parents and teachers were asked to mention what they like and what they dislike about the physical environment of the kindergarten. The results are addressed on Table 8 as below. As some teachers and parents indicate more than one answer to the questions, the overall percentage is over 100%.

Table 8. Feature parents and teachers like/dislike the most about the physical environment of the kindergarten

		Teachers	Parents
The most liking features of the kindergarten	Indoor Spaces	38%	13%
	Outdoor spaces	38%	22%
	The architecture of the building	69%	62%
	Indoor Spaces	69%	14%
The most disliking features of the kindergarten	Outdoor space	38%	4%
	The architecture of the building	31%	11%
	No dislikes	0%	66%

38% of the teachers liked the indoor spaces most because there are music and cinema rooms, there are washrooms inside classrooms, and everything in classrooms is made of wood. 13% of parents liked the indoor spaces due to the furnishing, washrooms in the classes and the cinema and music rooms. 69% of the teachers have disliked the indoor spaces because of the lack of a sleeping room, the size, and the shape of the classrooms, the materials of the furniture and the lack of toilet on the ground floor. 14% of parents didn't like the indoor spaces because there is no space to do sport, the dining hall is small, corridors and the entrance are narrow, and the carpets are not enough to warm the floors. 69% of the teachers liked the architecture of the kindergarten since the facade of the building is completely glass, and every classroom has a door which opens directly to the garden, and the building is round and designed for as a kindergarten, not as an apartment. 62% of the parents who liked the architecture of the kindergarten the most have also shared the same idea with teachers and only instead of not only mentioning transparent façade but also colorful façade. 31% of the teachers didn't like the architecture of the kindergarten since it is not one story building and big enough.

38% of the teachers liked the outdoor spaces the most because of the garden, while 38% dislike the outdoor area because space is limited and small. 22% of parents liked outdoor spaces because of the garden and animals, and only 4% have disliked the outdoor space due to the lack of a lack of semi-open path between the kindergarten's entry and garden. They have mentioned that they experience difficulties during rainy days. To compare the checklist evaluation with teachers and parents' responds, both groups were asked to name the strength and weakness of Ecological Kindergarten. The aim was to identify the response that includes items related to the physical environment. 42% (all parents) didn't say anything about the weak features of this kindergarten, but rest of the participants have mentioned more than one weaknesses, and therefore, the overall percentage is over 100% because most of the parents have more than one answer. Common answers of parents and teachers' answers have classified as different keywords (Table 9).

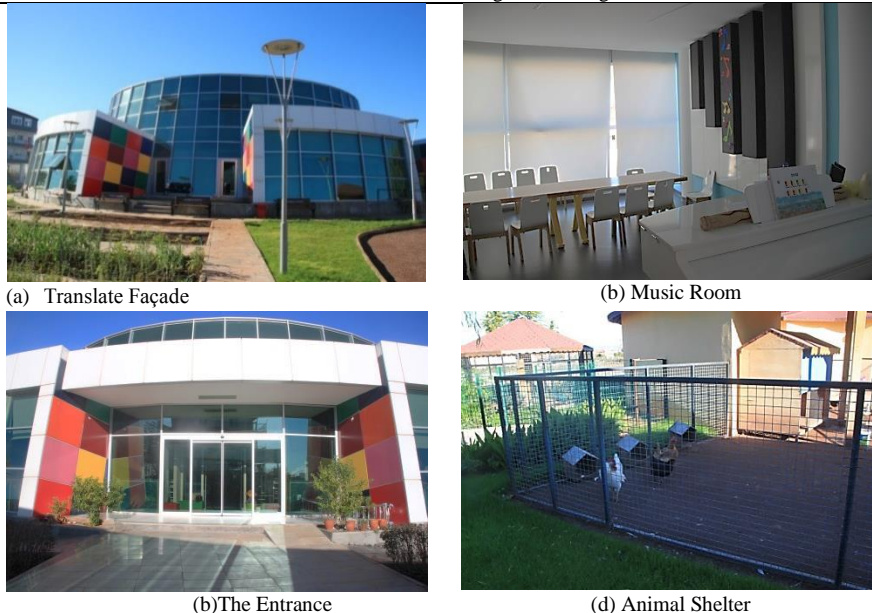
Table 9. Strong and weak features of this kindergarten according to parents

Strengths Response	Percentages
Architecture	14%
Garden and animals	11%
Ecological concept	20%
The education system and teachers	70%
Location	2%
Facilities	14%
The activities	9%
Washrooms in class	4%
Easy access to the administration	
Other (monthly fee, food, hygiene, reliability, being institutional, etc.)	20%
Weakness Response	Percentages
The field of the kindergarten is not big enough	4%
The education system and teachers	20%
Location	6%
Kids are getting sick a lot because of being outside in cold weather.	%
Hard to find natural materials for daily activities	6%
The security	6%
Lack of enough ecological design solutions	6%

According to Table 9, the percentage of features related with the physical environment of the building as strength or weakness is lower than 50%, and education system is considered as the main strength of this kindergarten. Building's architecture, availability of a place to keep animals, facilities, and availability of washroom in classrooms are mentioned by participants as strengths of ecological kindergarten, while lack of a solution to collect rainwater, lack of appropriate storage to store natural materials and lack of semi-open space are mentioned as weaknesses of this kindergarten.

Finally, both groups were asked if they think this kindergarten add a new dimension to its context. All teachers and most of the parents' answer to this question were yes. Participants believed that Ecological Kindergarten with its name, design, and educational system had added plenty of values to Döşemealtı context. Findings from the second stage of research confirm some of the extracted information of the first stage. Some of the participants also mentioned lack of enough outdoor space, lack of storage, lack of a solution to collect the rainwater, lack of a semi-open space and lack of common area as weakness physical environment. Parallel with the checklist result, most of the participants have found the transparent façade as strength. Some of them also mention the availability of zoo, music room, cinema room and appropriate furniture as positive features of Ecological Kindergarten. The façade of the kindergarten, outdoor spaces and some of the indoor spaces are as Table 10.

Table 10. Photos of the Ecological Kindergarten



## 5. Conclusion

There is a global movement towards supporting environmental-friendly behavior of children during early childhood (Alp et al. 2008; Hungerford & Volk 1990; Hines et al. 1986), this resulted in increasing the number of nature-oriented kindergartens. An Ecological Kindergarten in Döşemealtı, Antalya is a newly built kindergarten which has gained popularity among local people because of its approach to the environment. This study intended to evaluate the physical characteristics of this kindergarten and identified the strengths and weaknesses of its physical environment based on the requirements introduced by the 'Early Environmental Education.'

An evaluation checklist and a questionnaire survey are used to explore strengths and weaknesses of kindergarten's physical environment. Finding shows that kindergarten is achieved more success with the offered educational program rather than its physical space. According to the results of the checklist evaluation, the physical environment of the kindergarten does not meet the requirements of sustainable architecture. Having to say that the 'Environmental Sustainability' aspect of the building presented the weakest part of its layouts and characteristic. Results from checklist evaluation questionnaires identified similar weaknesses and strengths. According to both stage of research, well-defined activity areas (Music room and cinema room), various comfortable seating elements, Transparent façade and availability of zoo in the garden have add quality to physical environment, lack of semi-open spaces, enough outdoor space, well-design indoor storage, common areas and design solutions to collect rain-water and protect wind reduced this quality. These

similarities can be considered as physical environments' main positive and negative features in terms Early Environmental Education.

This study claims that an additional design solution can apply to Ecological Kindergarten to improve the quality of space and place for a better environmental early education. The gap in the literature regarding the architecture of early environmental education centers make it essential to conduct further studies and to identify the design requirements of nature-oriented early educational settings.

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