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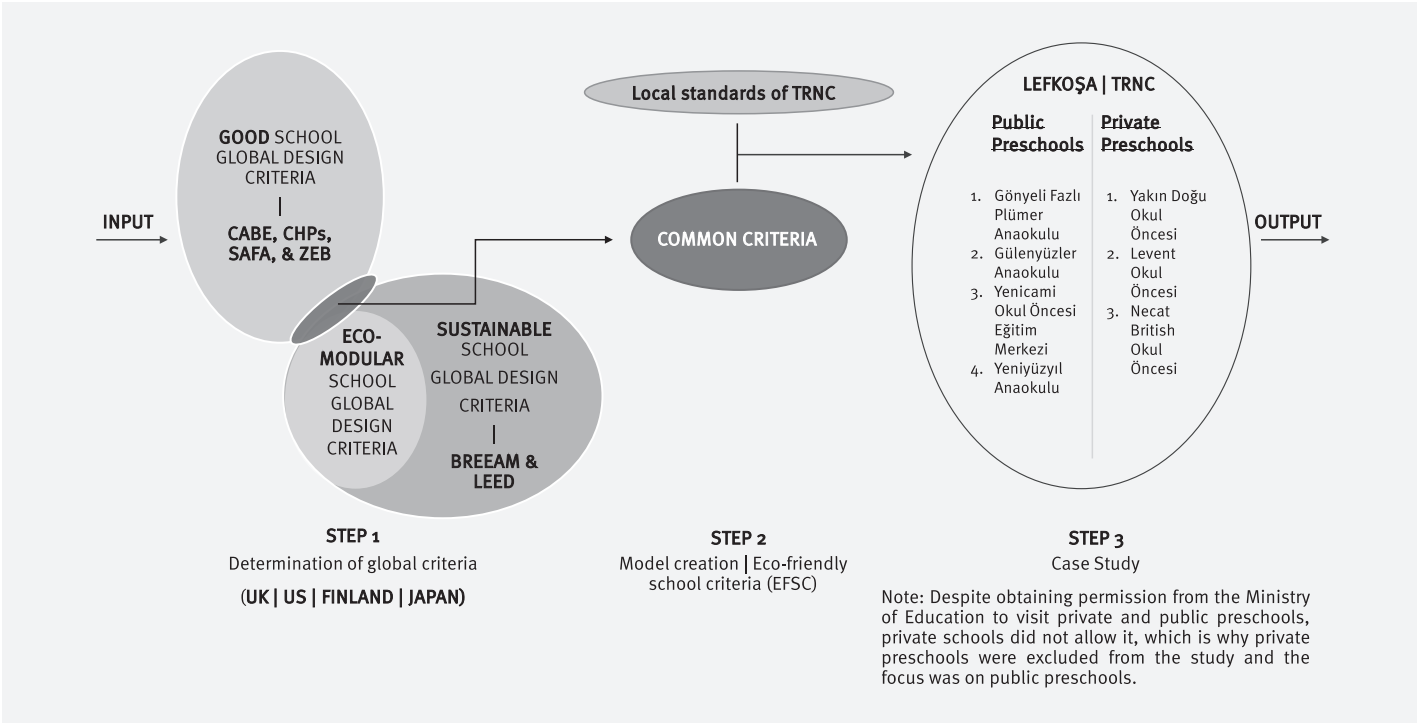

Fig. 1 Diagram showing the methods used in this study

Rasha Tarboush[1], Çimen Özburak[2]

Near East University, Faculty of Architecture, Department of Architecture, Nicosia, Turkish Republic of Northern Cyprus

[1] https://orcid.org/0000-0001-8210-5188

[2] https://orcid.org/0000-0002-8661-4403

tarboush.rasha@gmail.com
cimen.ozburak@neu.edu.tr

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Evaluating Pre-School Design in Lefkoşa, Northern Cyprus, Based on Global Sustainability Criteria

EDUCATIONAL SPACES
GLOBAL CRITERIA
PRE-SCHOOL DESIGN
SCHOOL-DESIGN STANDARDS
SUSTAINABLE DESIGN

Considering the design of schools is of utmost importance, especially in the early stages of education. When evaluating pre-schools in Lefkoşa, North Cyprus, we see that the emphasis is on providing classical design standards rather than modern standards. The common standards of global school design standards were collected and harmonized to form the criteria for the study under the title of "Eco-Friendly School Criteria" (EFSC) and then harmonized in the form of a questionnaire that was followed in the re-evaluation process of four public schools in Lefkoşa, North Cyprus. The aim of this study is to show the importance of increasing the scope of knowledge in North Cyprus about the concept of pre-school design, and to re-evaluate it to consider the extent to which the current design of schools conforms to the EFSC standards while taking into account local standards. The results showed that the average compliance rate of these schools with the EFSC standards is 68/110, which indicates a lack in providing a sustainable and comfortable learning environment for the user, including people with disabilities, to make them feel a sense of belonging to the place.

INTRODUCTION

Schools are regarded as the primary institutions aimed at developing generations intellectually, culturally, and literarily. Consequently, attention to school design is crucial in creating a comfortable educational setting that engages students, enhances focus, and fosters a love for learning (Valjan Vukić, 2012: 123-32; Gysbers, 2001: 96). A well-designed school environment is seen as a vital component in improving the quality of learning and teaching, as nurturing educational spaces contributes significantly to the development of students and instils enthusiasm for learning (Ural, 2023; Çanli, 2019). Adhering to legislation, including laws, administrative rulings, and recommendations, is essential for determining thermal comfort in pre-schools (Lovec et al., 2020: 346-359). The field of architecture aims to create both indoor and outdoor environments tailored to user needs while achieving maximum aesthetic and functional efficiency. Physical spaces impact the psychological well-being of users, their connection to the environment, and their overall comfort. Therefore, designers must create spaces that meet functional requirements and accommodate diverse situations (Zaunstöck and Grunewald, 2022). To achieve effective design, it is crucial to understand the relationship between people and their environments, taking into consideration the elements that foster user harmony with the design. The quality of a place is directly linked to its functionality and reception, particularly in pre-school settings, which are seen as foundational for nurturing a new generation filled with vitality, activity, and clarity of mind, along with their interaction with spaces (Baker, 2012: 6-9). School design must incorporate sustainability elements and create environments that help users adapt to their surroundings while being aware of the spaces around them. Methodologies for sustainability, assessment, development, and application in construction are considered essential measures for promoting a more sustainable environment (Sanei, 2022: 106-125). This study aims to highlight the significance of designing schools and educational spaces in enhancing learning and teaching processes, as schools play a pivotal role in cultivating thought and culture among generations (Wihardjo et al., 2017: 251-257; Gelfand, 2010). The scope of this research focuses on pre-school design, intending to compile global criteria and principles for the design of pre-schools to establish common standards that will facilitate the re-evaluation of pre-school design in Lefkoşa, North Cyprus, in accordance with international benchmarks. This study seeks to emphasize the importance of expanding knowledge about school design concepts, especially pre-schools, as practiced in Cyprus, to create a healthy and sustainable educational environment that harmonizes education with nature while ensuring user comfort in both educational and recreational areas. Additionally, it aims to enhance accessibility to all parts of the school for all students, particularly those with disabilities – whether motor, visual, or hearing impairments. Thus, this research is designed to serve as a turning point in re-evaluating the concepts and standards of school design in Cyprus as implemented by relevant authorities and to stress the need for rethinking cur-

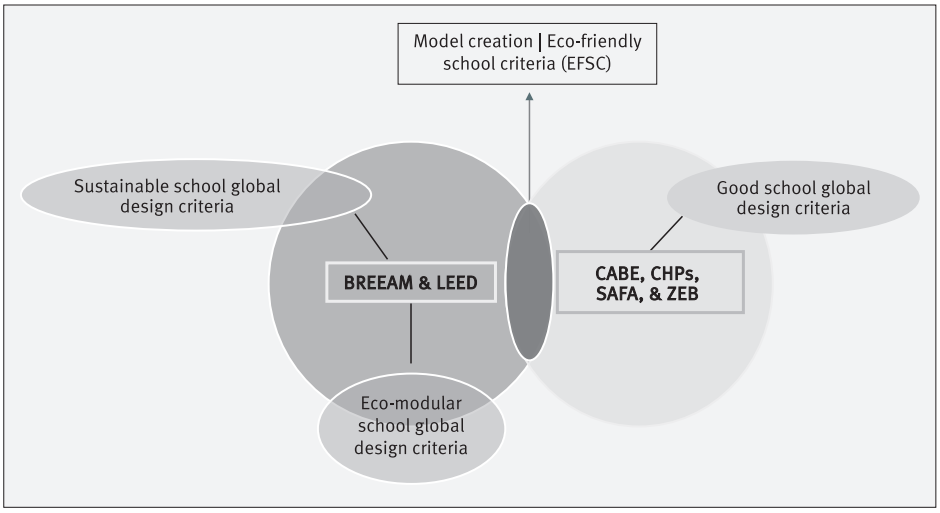

FIG. 2 EXTRACTING EFSC-SPECIFIC CRITERIA FROM COMMON CRITERIA AMONG GLOBAL CRITERIA

rent standards in existing schools. It will also demonstrate the importance of raising awareness about sustainable environmental design in educational facilities and the influence of local standards on the evaluation process alongside international norms.

Methodology

The reason for choosing the pre-school stage is that it is considered the most important stage in teaching and learning, as it contains the primitive foundation of the child's mind to prepare him mentally, psychologically, and intellectually for science. The degree of interest in designing educational spaces at this stage is very necessary, as the degree of interest leads to the child's mind and thoughts being negatively or positively affected during his educational stages, depending on the educational environment in which he grew up (Stipanec and Bartolac, 2015: 81-92; Ozer, 2017). The design of public and private pre-schools in the city of Lefkoşa in Northern Cyprus will be re-evaluated according to global criteria, as the pre-school stage is considered a cornerstone in building the child's personality and his connection to science and the learning environment (Smajlović et al., 2023: 299-311). Therefore, it is necessary to create a comfortable and purposeful scientific environment that attracts the child's attention to everything going on around him in terms of spaces, technologies and designs that help him link his interest in the internal environment to the external environment and provide lighting and good ventilation. The study followed certain methods to achieve the desired goal, as follows:

1. Collecting the global criteria designated for the design of educational spaces and schools.

2. Collecting local standards of Northern Cyprus (TRNC) designated for designing educational spaces and schools.

3. Re-evaluation of schools at the pre-school level in Lefkoşa, Northern Cyprus, to determine the extent to which the criteria used are consistent with global criteria (Fig. 1).

New terminology has been selected to bring together global standards in a way that makes it easier for the reader to follow the points and their connection to each other. As shown in Figure 2, the standards are expressed in different terms from one guide to another, so work has been done to develop and summarize the terms used in the common global standards and put them in a list called EFSC standards. Figure 3 illustrates the process of extracting the five EFSC criteria from the Good, Sustainable, and Eco-friendly criteria and how the Average rating is calculated. Figure 4 shows the process of extracting the average EFSC rating from the LEED and BREEAM ratings, each of them has a total rate of 100 but with some additional

From good, sustainable, and eco-modular to EFSC criteria

Good school design criteria:
- Safety features | Safety measures
- Common areas | Functional spaces | Classroom layout
- Comfort level | Indoor comfort
- Basic materials
- Fixed designs | Standard layout
- Basic design | Functional design
- Accessibility features | Open access
- Educational technology | Traditional tech tools
- Basic infrastructure | Educational facilities

Sustainable school design criteria:
- Safety and security | Safety protocols
- Learning environment | Multi-functional spaces
- Indoor climate | Comfort conditions | Thermal comfort
- Renewable resources | Sustainable materials
- Flexible spaces | Adaptive learning spaces
- Eco-friendly design | Green design
- Universal design | Inclusive access
- Sustainable technologies | Green technology
- Sustainable infrastructure | Eco-infrastructure

Eco-modular school design criteria:
- Safety standards | Secure design
- Modular units | Flexible learning areas | Adaptable spaces
- Comfort design | Wellness features
- Renewable energy systems | Eco-friendly materials
- Modular flexibility | Reconfigurable spaces
- Modular design | Adaptive design
- Accessible design | Barrier-free access
- Smart technology | Advanced tech solutions
- Modular infrastructure | Flexible infrastructure

The criteria have been reorganized under EFSC-specific terminology, as follows:
- ✓ Design quality (for safety and security): emphasizes the importance of creating secure and functional environments.
- ✓ Health and well-being focuses on fostering a conducive atmosphere for learning through comfort and climate control.
- ✓ Sustainability: underlines the growing responsibility of educational institutions to operate in an environmentally friendly manner.
- ✓ Flexibility and adaptability: highlight the need for learning spaces that can evolve to meet changing educational demands.
- ✓ Equity and accessibility: stress the importance of inclusivity, ensuring that all students can participate fully in educational experiences.

Fig. 3 Extracting EFSC criteria from global good, sustainable, and eco-modular school criteria

Fig. 4 EFSC average rating

EFSC criteria average rating extracted from LEED and BREEAM common criteria credits weight

LEED credits weight	BREEAM credits weight	Average	EFSC average rating out of 110
Integrative process (IP) 1 point	Management (Man) 11 credits	6	**Design quality for safety and security: 26%** ✓ 6/6 (IP+Man) ✓ 6/12 (Security of site design and Risk assessment). ✓ 4/4 (Pol) ✓ 8/8 (IN+Inn) ✓ 2/2 (RP)
Location and transportation (LT) Up to 16 points	Transport (Tra) 10 credits	13	
Sustainable site (SS) Up to 10 points	Land use & ecology (LE) 13 credits	12	
Water efficiency (WE) Up to 11 points	Water (Wat) 7 credits	9	**Health and well-being: 17%** ✓ 2/12 (Access to nature). ✓ 15/15 (EQ+Hea)
Energy and atmosphere (EA) Up to 33 points	Energy (Ene) 16 credits	25	
Materials and resources (MR) Up to 13 points	Materials (Mat) 15 credits	14	**Sustainability: 48%** ✓ 2/12 (Site selection & Sustainabile landscape). ✓ 9/9 (WE+Wat) ✓ 25/25 (EA+Ene) ✓ 10/14 (Sustainable materials) ✓ 2/2 (Wst)
Indoor environment quality (EQ) Up to 16 points	Health & wellbeing (Hea) 14 credits	15	
Waste (Wst) 0 points	Waste (Wst) 6 credits	2	
Pollution (Pol) 0 points	Pollution (Pol) 8 credits	4	**Flexibility and adaptability: 6%** ✓ 2/12 (Design and furniture flexibility). ✓ 4/14 (Using materials that can adapt to different construction requirements, accommodating future modifications).
TOTAL 100	**TOTAL 100**	**100**	
Innovation (IN) Up to 6 points	Innovation (Inn) 10 credits	8	**Equity and accessibility: 13%** ✓ 13/13 (LT+Tra)
Regional priority (RP) Up to 4 points	Regional priority (RP) 0 credits (regional specific)	2	
TOTAL 110	**TOTAL 110**	**110**	

NOTE: The proportions were determined according to LEED and BREEAM standards and how the full and partial proportions were distributed, according to the reference guides and documents found on their official websites.

Initial design considerations (1980s-1990s)	Recognition of educational importance (2000s)	Emphasis on child-centered design (2010s)	Sustainable design principles	Regulatory framework and accreditation
In the earlier years, pre-school facilities in Lefkoşa were primarily designed with basic functional requirements in mind. The focus was largely on the provision of space for activities rather than specific design criteria that catered to early childhood needs. Safety and basic infrastructure were prioritized, but the environments tended to be conventional and not particularly tailored to young learners.	By the early 2000s, there was a gradual shift in attitudes towards pre-school education. This period marked an increase in both the number and quality of pre-school buildings, driven by a growing recognition of the importance of early childhood education. Design criteria began to evolve to foster creativity, social interaction, and active learning, emphasizing the need for spaces that provided opportunities for play and exploration.	In the 2010s, there was a heightened effort to develop child-centered design criteria for pre-school buildings. Architects and educators began collaborating to create spaces that supported various developmental needs, incorporating elements such as: Open and Flexible Spaces: Allowing for different types of activities and interactions. Natural Lighting: Maximizing daylight to create a more welcoming and stimulating environment. Outdoor Access: Encouraging outdoor play and learning through accessible outdoor spaces or gardens. Safety and Accessibility: Ensuring that facilities were safe and accessible for all children, including those with disabilities.	In recent years, the concept of sustainability has gained traction, influencing pre-school design criteria. New buildings are increasingly incorporating eco-friendly materials, energy-efficient systems, and designs that promote environmental stewardship among children. This shift aligns with broader global trends toward sustainability in architecture.	The establishment of a regulatory framework and accreditation standards for pre-schools also played a crucial role in shaping design criteria. Government guidelines began to incorporate both local cultural and environmental factors alongside internationally recognized standards, ensuring that pre-school designs met the specific needs of the community.

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School 1	It was opened in 2014.
	It is a new building that has never been used for any other purpose before.
	Teaching concept: Natural and play based active learning.
	Children age 4-5 years | Groups up to 15 students for each group.
School 2	Built before 1974.
	Used for construction teacher academy, then primary school, and now it is a pre-school.
	Teaching concept: Natural and paly based active learning.
	Children age 4-5 years | Groups up to 15 students for each group.
School 3	This pre-school is from the British period before 1960.
	There is no information about its previous uses.
	Teaching concept: Play-based learning.
	Children age 4-5 years | Groups up to 15 students for each group.
School 4	It was used as pre-school after 1974.
	It was a Greek school before 1974.
	Teaching concept: Montessori methods with nature-based active learning.
	Children age 4-5 years | Groups up to 15 students for each group.

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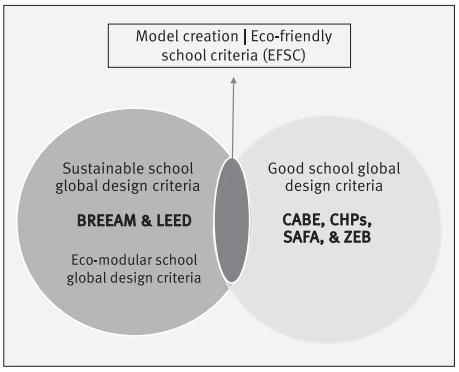
FIG. 5 TIMELINE OF DEVELOPMENTS IN PRE-SCHOOL EDUCATION IN LEFKOŞA, TRNC: HISTORICAL OVERVIEW

FIG. 6 INFORMATION ABOUT RE-EVALUATING PRE-SCHOOLS IN LEFKOŞA, TRNC

FIG. 7 CHART PRESENTING THE MAIN THREE TYPES OF SCHOOL DESIGN CRITERIA



standards, it is out of 110, such as innovation and regional priority standards.

Sustainable design standards generally seek to reduce resource consumption, minimize waste generation, and promote environmentally friendly practices throughout the building life cycle (Boeri and Longo, 2013: 140-157). This study was conducted to consider the percentage of compliance of pre-school design standards in Lefkoşa with international standards and re-evaluate them. Still, local standards cannot be ignored, as they play an important role in the re-evaluation due to their importance in taking into account the regional climate and local physical, cultural, and social factors (Smajlović and Novalić, 2020: 249-260).

DATA ANALYSIS

The data obtained from the questionnaire were evaluated according to the EFSC criteria, and the questions were placed in 5 sections (design quality for safety and security, health and well-being, sustainability, flexibility and adaptability, equality and accessibility). The data obtained from the questionnaire were evaluated according to the EFSC criteria, and the questions were placed in 5 sections (design quality, health and well-being, sustainability, flexibility and adaptability, equality and accessibility). Each section was evaluated separately by calculating the number of criteria available in the school compared to the number of required criteria. For example, in the design quality criterion there are 19 points, and let us assume that a school provides 9 points out of 19. Since the design quality as a whole has a percentage of 26/110, in this case the calculation is as follows: (Total percentage) / (Number of points) = Percentage of each point of the design quality points separately:

$26/19 = 1.36$

Then the school's compliance percentage with the EFSC criteria is calculated in the following way: Percentage of one point × number of matching points = Conformity percentage:

$1.36 \times 9 = 12.24$ (The percentage of the hypothetical school's compliance with the EFSC criteria out of 26.)

After calculating the percentages of compliance of all criteria for the hypothetical school, the total percentage is calculated by adding the results of the conformity of the five criteria for the same school with the EFSC criteria. Finally, after calculating the compliance percentages of the schools concerned, the average compliance percentage of the pre-schools in Lefkoşa with the EFSC standards should be calculated by dividing all the total percentages of the schools by the number of schools, and the average percentage will appear.

MODEL CREATION

Early education, especially pre-school, is a vital period in children's development. It con-

tributes to the development of social, intellectual and emotional skills necessary for integration into society. In recent years, pre-school education in Lefkoşa, Northern Cyprus, has witnessed significant developments that have improved the quality of education, provided and expanded the scope of services. In this context, we shall review the history and development of pre-schools in this region, focusing on the main aspects that have influenced early education. Figure 5 provides a brief overview. Figure 6 shows some important information about the pre-schools evaluated, including their history, whether the pre-school building was adapted for other purposes or not, the teaching concept that explains spatial specificities, the number of students and the size of groups. Figure 7 shows three types of school design criteria that have been worked on: good sustainable, sustainable, and portable designs, then combining common global criteria, that were called Eco-Friendly School Standards (EFSC).

Findings

The results and outcomes of the re-evaluation of the public pre-schools in Lefkoşa, which were conducted within the framework of the EFSC criteria, were evaluated as follows:

The percentages were divided into, design criteria 26/110, health and well-being 17/110, sustainability 48/110, flexibility and adaptability 6/110, equality and accessibility 13/110, and 110 as total. The largest percentages were focused on criteria that affect architectural design in terms of accessibility and sustainability. Table I shows the evaluation of design quality in public pre-schools in Lefkoşa according to EFSC criteria. This section includes 19 evaluation points. The criteria available in each school are indicated and then the number of matching points is calculated to extract the percentage.

By obtaining the evaluation results of the schools, the average percentage of conformity of the design quality criteria of these schools with the EFSC criteria was reached, and the result is 14.7 approximately 15/26. Table II shows evaluation of health and well being in public pre-schools in Lefkoşa according to EFSC criteria. This section includes 16 evaluation points.

By obtaining the evaluation results of the schools, the average percentage of conformity of health and well-being criteria of schools with the EFSC criteria was reached, and the result is 13.27 approximately 13/17. Table III shows evaluation of sustainability in public pre-schools in Lefkoşa according to

Table I Evaluation of design quality in public pre-schools in Lefkoşa according to EFSC criteria

Design quality (for safety and security) 26/110

Criteria	School 1		School 2		School 3		School 4		Average ratio Out of (26)
		Out of (26)		Out of (26)		Out of (26)		Out of (26)	
1. Keyed locks	✓	15.05	✓	16.42	✓	10.94	✓	16.42	15
2. Biometric systems	x		x		x		x		
3. Fences	✓		✓		✓		✓		
4. Badge system	x		x		x		x		
5. Emergency shelters	x		x		x		x		
6. Fixed cameras	✓		✓		✓		✓		
7. Motion detection	x		x		x		x		
8. Audio recording	x		x		x		✓		
9. Adequate alarms	✓		✓		x		✓		
10. Adequate visual alerts	✓		✓		x		✓		
11. Adequate auditory alerts	x		x		x		x		
12. Adequate evacuation plans	✓		✓		✓		✓		
13. Adequate fire suppression systems	✓		✓		x		✓		
14. Fire exits	✓		✓		✓		✓		
15. Lightning rods (regulation on fire protection of buildings)	x		✓		x		x		
16. Fire resistant material	x		x		x		x		
17. Is the building resistant to earthquakes?	✓		✓		✓		✓		
18. Has an earthquake test been done?	✓		✓		✓		✓		
19. Infrastructure for future technological updates	✓		✓		✓		✓		

Table II Evaluation of health and well being in public pre-schools in Lefkoşa according to EFSC criteria

Health and well being 17/110

Criteria	School 1		School 2		School 3		School 4		Average ratio Out of (17)
		Out of (17)		Out of (17)		Out of (17)		Out of (17)	
1. Daylight	✓	13.81	✓	14.87	✓	10.62	✓	13.81	13
2. Ventilation	✓		✓		✓		✓		
3. Acoustic	✓		✓		✓		✓		
4. Orientation	✓		✓		✓		✓		
5. Recreational areas	✓		✓		✓		✓		
6. Playing areas	x		✓		✓		✓		
7. Green spaces	✓		✓		x		✓		
8. Outdoor learning opportunities	x		✓		✓		✓		
9. Indoor spaces designed for music and creative activities	✓		✓		x		✓		
10. Indoor hall for multi-purpose use	✓		✓		x		x		
11. Adequate classrooms	✓		✓		✓		✓		
12. Adequate offices	✓		✓		x		x		
13. Art l science classrooms	✓		✓		✓		✓		
14. Indoor sport spaces	✓		x		x		x		
15. Thermal Comfort: Thermal comfort shared between health and well-being and sustainability	x		x		✓		✓		
16. Flooring (consideration for comfort and safety)	✓		✓		x		✓		

TABLE III EVALUATION OF SUSTAINABILITY IN PUBLIC PRE-SCHOOLS IN LEFKOŞA ACCORDING TO EFSC CRITERIA

Sustainability 48/110									
Criteria	School 1		School 2		School 3		School 4		Average ratio Out of (48)
		Out of (48)		Out of (48)		Out of (48)		Out of (48)	
1. Green roofs	✓	34.28	✓	27.42	✓	27.42	✓	34.28	31
2. Green walls	✓		✓		✓		✓		
3. Sustainable landscaping	Nature inspired playground	✓		✓		✓		✓	
4. Materials (materials supporting sustainability and health)	✓		✓		✓		✓		
5. Site selection	✓		x		x		x		
6. Energy efficiency	x		x		x		x		
7. Water efficiency (rainwater harvesting)	x		x		x		✓		

TABLE IV EVALUATION OF FLEXIBILITY AND ADAPTABILITY IN PUBLIC PRE-SCHOOLS IN LEFKOŞA ACCORDING TO EFSC CRITERIA

Flexibility and adaptability 6/110									
Criteria	School 1		School 2		School 3		School 4		Average ratio Out of (6)
		Out of (6)		Out of (6)		Out of (6)		Out of (6)	
1. Ability to add mobile classrooms as needed.	x	2.4	✓	3.6	x	2.4	✓	4.8	3
2. Designing spaces that can be reconfigured as educational needs evolve.	x		✓		x		x		
3. Installation of demountable partitions and movable walls to create flexible classroom layouts to allow spaces to be divided or expanded to accommodate various class sizes and activities.	x		x		x		✓		
4. Creating multi-use spaces within the classroom design, such as areas that can be used for group discussions, individual work, or collaborative projects. This versatility accommodates a variety of learning activities.	✓		✓		✓		✓		
5. Adaptable and movable furniture and equipment that can be easily rearranged to support different teaching methods and learning activities.	✓		x		✓		✓		

TABLE V EVALUATION OF EQUITY AND ACCESSIBILITY IN PUBLIC PRE-SCHOOLS IN LEFKOŞA ACCORDING TO EFSC CRITERIA

Equity and accessibility 13/110									
Criteria	School 1		School 2		School 3		School 4		Average Ratio Out of (13)
		Out of (13)		Out of (13)		Out of (13)		Out of (13)	
1. Ramps	✓	4.87	✓	8.12	x	1.62	✓	9.75	6.09
2. Elevators & Staircases (Since all schools consist of ground floor only, the average ratio will be calculated by excluding elevators and staircases.)	x		x		x		x		
3. Accessible to all Spaces/ Services	✓		✓		x		✓		
4. Safety Railings	✓		✓		✓		✓		
5. Accessible Information (Visual Materials)	x		✓		x		✓		
6. Accessible Information (Auditory Materials)	x		✓		x		✓		
7. Transportation: Provide bike racks.	x		x		x		x		
8. Transportation: pedestrian pathways.	x		✓ x		x		✓		
9. Access to public transportation.	x		x		x		x		

EFSC criteria. This section includes 7 evaluation points.

By obtaining the evaluation results of the four schools, the average percentage of conformity of sustainable criteria of schools with the EFSC criteria was reached, and the result is 30.85 approximately 31/48.

Table IV shows evaluation of flexibility and adaptability in public pre-schools in Lefkoşa according to EFSC criteria. This section includes 5 evaluation points.

By obtaining the evaluation results of the schools, the average percentage of conformity of flexibility and adaptability criteria of school design with the EFSC criteria was reached, and the result is 3.3 approximately 3/6. Table V shows evaluation of equity and accessibility in public pre-schools ın Lefkoşa according to EFSC criteria. This section includes 9 evaluation points. Since all schools consist of ground floor only, the average ratio will be calculated by excluding elevators and staircases, this section will be evaluated using 8 evaluation points only.

Accordingly, schools 1, 2, 3 and 4 obtained the following percentages: 4.87, 8.12, 1.62 and 9.75 out of 110. The average ratio is 6.06 approximately 6/110.

Figure 8 shows the evaluation of each pre-school section, each school will be evaluated individually. Average final percentage for each school individually = Sum of school section percentages. After obtaining the percentage of each section of the criteria separately, the final percentage of the conformity of the public pre-schools design in Lefkoşa with the EFSC criteria will be found by collecting the results of the sections to reach to the final percentage of each school (Fig. 9). The final average percentage of Lefkoşa pre-schools in total = Sum of percentages of schools / Number of schools:

(70+70+53+79) / 4 = 272/4 = 68/110

Discussion

Although schools meet classical standards and some modern ones, awareness must be spread about developing educational spaces to include modern standards and advanced systems, to increase support for education and safety, to integrate modern technology with educational methods, and to create learning environments integrated with nature. Figure 10 shows the average ratio of Lefkoşa public pre-schools' design criteria conforming to EFSC criteria.

Environmental awareness regarding sustainable buildings should be cultivated to create educational spaces and lifestyles that are highly compatible with nature, thereby contributing to environmental protection. Pre-schools play a crucial role in this foundational stage for children, as they begin to observe and engage with their educational and recreational environments, as well as their perceptions of the surrounding spaces. Therefore, it is essential to enhance children's relationship with the physical environment, encouraging interactions that foster communication skills through activities centered on sustainable environmental education.

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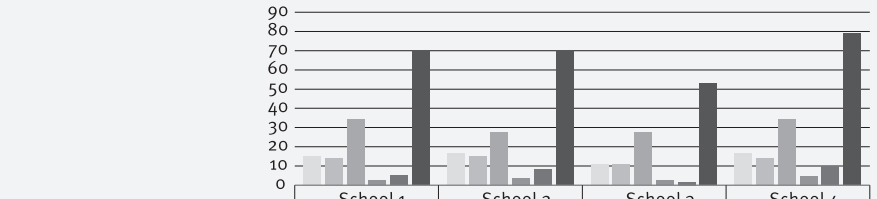


	School 1	School 2	School 3	School 4
Design criteria 26/110	15,05	16,42	10,94	16,42
Health and well being 17/110	13,81	14,87	10,62	13,81
Sustainability 48/110	34,28	27,42	27,42	34,28
Flexibility and adaptability 6/110	2,4	3,6	2,4	4,8
Equity and accessibility 13/110	4,87	8,12	1,62	9,75
Total 110	70	70	53	79

9

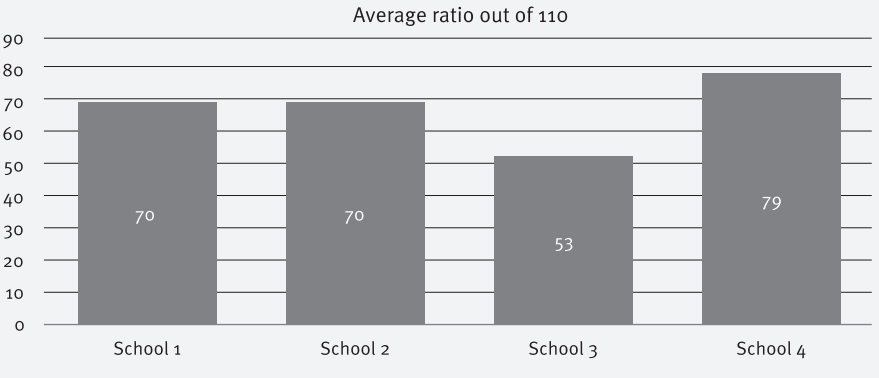


Fig. 8 Evaluation chart of the main criteria

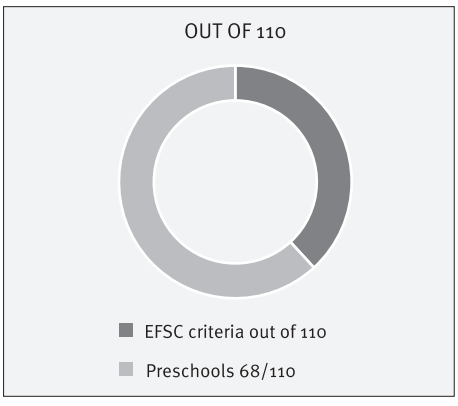
Fig. 9 Final result of the pre-schools' evaluation

Conclusion

This study was conducted with the aim of re-evaluating pre-schools design, in Lefkoşa, Northern Cyprus, to determine their compliance with global sustainability standards and to consider the level of awareness about this. During this study, after collecting global standards and extracting commonalities between them to create the EFSC standards, it was found that the average percentage of compliance of the design standards of public pre-schools in Lefkoşa with the EFSC standards is 68/110, which indicates a lack of awareness towards many standards, including:

– Safety and security standards using modern technologies and devices.

Fig. 10 Average ratio of Lefkoşa public pre-schools' design criteria conforming to EFSC criteria



– Health and well-being standards, as the deficiency here varies from one school to another, and in general lies behind the lack of outdoor spaces dedicated to education and the lack of interest in providing thermal comfort in some schools such as schools 1 and 2, as well as the lack of indoor spaces dedicated to sports and others dedicated to art and multi-use as in schools 2, 3 and 4.

– Sustainability standards, schools lack interest in energy and water efficiency as well as site selection.

– Flexibility and adaptability standards, here only standards that provide a limited degree of flexibility and adaptation to various teaching methods were provided.

– Equality and accessibility standards: There is a lack of attention to providing visual, audio and kinetic information that helps in reaching all parts of the school, whether internal, external or service, including providing safe access to public transportation and safe pedestrian paths.

Based on the results, it is clear that there is a lack of awareness of the importance of designing environmentally friendly schools. The pre-school stage is a crucial stage in shaping the child's personality and his relationship with the environment and his surroundings, enabling him to focus, explore and receive information easily. It is necessary to improve schools to keep pace with technological developments while creating sustainable educational environments. This includes developing educational spaces and raising awareness of the spaces and buildings in which children live and use them, as well as linking learning to nature and training children to deal with and protect it. Moreover, it is necessary to take into account local standards alongside international standards, as local standards reflect social, cultural and climatic contexts, ensuring that the needs of society are met more effectively. To raise the level of schools in the field of sustainable design, awareness of the necessary sustainable standards in these institutions must be enhanced. Children's psychology and their integration with nature and the surrounding environment must also be taken into account. It is also important to develop accreditation standards for schools in Lefkoşa, North Cyprus, in line with EFSC standards while incorporating local specificities to ensure best educational practices in line with the cultural values and unique needs of the community. In this way, pre-schools can contribute to creating effective and sustainable learning environments that enhance children's well-being and create a deeper connection to the world around them.

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Authors' biographies and contributions

Rasha Tarboush received her B.Arch. degree in Architecture from NEU (2017). She completed her master's (2019). Currently, she is a Ph.D. candidate in Architecture at the NEU and works as a lecturer in Architecture at the BAU Cyprus. The major study fields are curvilinear architecture and sustainable school design.

Çimen Özburak received her B.Arch. degree in Architecture from NEU (2003). She completed her master's (2014) and Ph.D. degrees (2018) in Architecture at the NEU. Currently, she works as an Assist. Prof. (2019) at the NEU. The major study field is sustainable spaces and architecture for preschool pupils.

Conceptualisation: R.T. and Ç.Ö.; methodology: R.T. and Ç.Ö.; software: R.T.; validation: R.T. and Ç.Ö.; formal analysis: R.T.; investigation: R.T.; resources: R.T.; data curation: R.T. and Ç.Ö.; writing – original draft preparation: R.T.; writing – review and editing: R.T. and Ç.Ö.; visualization: R.T.; supervision: Ç.Ö.; project administration: Ç.Ö.; funding acquisition: R.T. Both authors have read and agreed to the published version of the manuscript.