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Araştırma Makalesi

Evaluations on The Landscapes of School Gardens: İzmit Central District of Kocaeli Province Sample

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ÖZ

Okul bahçeleri; rekreasyonel, sosyal, ekolojik, psikolojik, öneme sahip olup, çocuk ve gençlerin yetişmesini, gelişmesini etkileyen alanlardır. Çocuk ve gençlerin günlük yaşamlarının büyük bir bölümü de okulda ve okul bahçelerinde geçtiğinden, okul bahçelerinin düzenlenmesi iç mekanlar kadar önemli alanlardır.
Bu çalışmanın amacı; Kocaeli ili İzmit merkez ilçesinde bulunan okullar örneğinde, okul bahçelerinin peyzajına ilişkin durum değerlendirmesi yapmaktır. Bu amaçla; İzmit'te yer alan 30 ilköğretim okulu ve 19 lise-dengi okul olmak üzere toplam 49 adet okul bahçesi, alan kullanım biçimleri, donatı elemanları ve bitki materyali yönünden incelenerek değerlendirmeler yapılmıştır. Okulların alan kullanımlarına ilişkin analizlerde oransal dağılım, donatı elemanları ve bitki materyali verilerinin analizinde ise frekans dağılımı yöntemleri kullanılmıştır. Çalışmadan elde edilen sonuçlara göre; okul bahçelerinin peyzajına yeteri kadar önem verilmediği belirlenmiştir. Alan kullanımı yönünden mevcut değerlerin, gelismis ülkelerdeki standartların çok altında olduğu tespit edilmiş, ilköğretim okullarının sadece % 43,33'ünde, lise ve dengi okullarında ise %57,89'unda yeşil alanların bulunduğu tespit edilmiştir. Yeşil alan varlığı yönünden; en fazla yeşil alana sahip olan okul ile en az yeşil alana sahip olan okul arasında ilköğretim okullarında 313 kat fark, lise ve dengi okullarda ise 57 kat fark olduğu belirlenmiştir. Mevcut yesil alanlarda ise bitki tür çeşitliliği çok azdır. Çim alanlar ile çiçeklikler yok denecek düzeydedir. Oyun çağındaki çocukların eğitim gördüğü ilköğretim okullarının %93,34'ünde oyun grubu bulunmamaktadır. Lise ve dengi okulların %47'sinde basketbol ve voleybol için uygun çok amaçlı spor alanı bulunmaktadır.
Çalışma sonucunda, okul bahçelerinin eğitim ve öğretimin bir parçası olarak ele alınması gerektiği, tüm öğrencilerin eğitim ve öğretim imkanlarından eşit olarak yararlanabilmesi için donatı alanları ve donatı elemanları organizasyonunda eşitcil bir standartın getirilmesi önerilmektedir.

Anahtar Kelimeler: *İzmit, Okul Bahçesi, Peyzaj, Peyzaj Elemanları, Alan Kullanımı*

Okul Bahçelerinin Peyzajına İlişkin Durum Değerlendirmesi: Kocaeli ili İzmit Merkez İlçesi Örneği

ABSTRACT

School gardens are the spaces that affect the growth and development of children and the teenagers with their recreational, social, ecological and psychological importance. Since the children and the teenagers spend the majority of their daily lives at schools and in school gardens, the design of these gardens is as important as the indoor designs.
The objective of this study is to evaluate the current status of the landscape of the school gardens considering the sample schools located in İzmit, central district of Kocaeli province. For this purpose, a total of 49 school gardens, 30 of which belong to primary schools and 19 to high schools and their equivalents, have been studied and evaluated in terms of space use profiles, landscape design components and vegetal components. While proportional range method has been used in the analysis of the space use at schools, frequency analysis method has been utilised in the analysis of the data relating the landscape components and the vegetal components. According to the results derived from the study it has been determined that landscape design of the school gardens is ignored. It has also been determined that the rates related to space use are far below the standards when compared with the developed countries. Green space use has been observed only in 43.33 % of the primary schools and 57.89 % of high schools and their equivalents. When considered in terms of green space use, it has been specified that the difference between the school with the largest green area and the school with the least green area is 313 times higher in primary schools and 57 times higher in high schools and their equivalents. Plant diversity, on the other hand, on existing green spaces has been determined to be quite poor. Grass areas and flower beds are scarcely used. 93.34 % of the primary schools, where children at play age are trained, do not have playgroups. Similarly, 47 % of the high schools and their equivalents do not have multifunctional playgrounds suitable for basketball and volleyball games.
As a result of the study, it has been suggested that the school gardens should be regarded as a part of education and training; a uniform standard should be adopted in the organisation of spaces and components in order to ensure that all students have equal access to education and training opportunities.

Keywords: *İzmit, Landscape Design, Landscape Design Elements, School Garden, Space Use*

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1. INTRODUCTION

Schools constitute the most influential environment where a child spends most of his/her time. Data derived and incidences observed through this environment form the keystones for the adaptation of the child to the society as a healthy individual (Erdönmez, 2007). School gardens, on the other hand, are open spaces which are to be designed and equipped for enabling children and teenagers carry out recreational activities, sports activities and entertainment.
School gardens should meet recreational needs of the students and form an attractive and comfortable environment where the students shall feel themselves relaxed in their spare times (Golby and Appleby, 1997).
An important aspect of the school gardens and their planning especially due to increasing environmental problems is their ability to train individuals who are sensitive to the environment and, at the same time, who can protect nature and its units (Bradley, 1995). Many of the urban spaces are surrounded by concrete and asphalt as a result of unplanned urbanization. Children and teenagers live away from nature and natural environment. Therefore, as an effective means of learning, green space is of great importance. School gardens are also good opportunities for understanding children and young people. Encouraging group works in these gardens shall promote cooperation among students as well.
As a result of insufficient space and limited resources that hinder students from moving freely in most of the school gardens, not all the students are able to benefit from the opportunities equally. Playgrounds included within the borders of school gardens, enable children to be mentally dynamic during break times throughout the day. Another factor providing particularly healthy life environments within the outdoor layout of the school gardens is the presence of vegetal components and their aesthetical design (Aksu and Demirel 2011).

According to Çorlu (1996), the influence of the school gardens on the students are evaluated considering following titles:

- ✓ Physical and mental development
- ✓ Recreation
- ✓ The creation of activities that respond to most of the students' needs
- ✓ Ensuring security of life and property of the students
- ✓ Rising awareness of the environment and interacting with the environment
- ✓ Student socialization
- ✓ Providing hygienic environment for students
- ✓ Utilisation of the garden as a place of education and training.

An ideal school garden should include a kind of natural landscape space. The use of indoor, outdoor and green spaces should be planned considering grade and age differences. The following places should be taken into consideration during planning of the mentioned spaces: Playfields, spaces set for vegetation, sitting components, potable water facilities and water fountains, hiking trails, parking and bicycle lots, shuttle parks, personnel and guard booths, parade areas and multifunctional spaces, waiting areas for parents and meeting halls for the use of parent-teacher association. Besides, design components such as terrarium, vivarium, aquarium, and plant pool for ecological applications should exist (Wolf 1967). Besides, school gardens should include vegetal components (trees, bushes, flowers and grass areas); animals; ponds or pools; sites and components suitable for sitting, leaning, taking shelter or hiding; some kind of flexible equipment and areas that encourage the children to create their own space by using their own imagination and creativity (Fjortoft and Sageie 2000).

The Ministry of National Education of the Republic of Turkey involves the following principles regarding the designing of the school gardens:

In terms of space use, besides educational structures and students' hostels at boarding schools, schools should have amphitheatres and suitable areas for outdoor classes to handle the lectures in the open air under appropriate air conditions. Thereby, students shall find opportunities to express themselves; improve their creativity and imagination; a kind of stimulation shall be provided for their curiosity and they will be able to present their educational and cultural activities on these spaces. School gardens should include at least one volleyball court and one basketball court. The dimensions of the volleyball court should be 13 m x 22 m and the basketball court should be 19 m x 32 m. On the conditions that the school garden has enough space, it is advised to have an indoor sports hall and a miniature football pitch with the dimensions 24 m x 42 m. In order to ensure the creation and continuity of common local and cultural values among students, playgrounds for traditional children games should also be included within the borders of school gardens. For instance the dimensions of the playground for the game "9 Men's Morris", which is one of the traditional children games, should be either 3 m x 3 m, 2 m x 2 m or 1 m x 1 m. As for the playground of the game "Drop the Handkerchief", another traditional game, the dimensions should be minimum 15 m x 27 m or maximum 20 m x 40 m. The playground for "Hopscotch", on the other hand, should consist of 8 squares with the dimensions 45 cm x 45 cm each. The floor of the playgrounds should be smooth and flat. Furthermore school gardens should have parade areas ground of which should be covered with anti-slide material providing a space of at least 2 m^2 for each student. As for design components, the Ministry makes it obligatory that every school garden has a space for Ataturk's Bust and a minimum 6 m-tall flag post on the right hand side of the school garden when entered. Additionally, areas that contribute children's physical development with the activities such as running, jumping, climbing and appropriate game tools and equipment for the age groups should be included. Arbour-shaped sitting areas and sitting groups, made of wooden material preferably, that enable students and teachers to sit; have some rest and communicate when not handling the classes and thus contribute to their social development should also be included. School gardens should also include as much as possible green areas; ecologically compatible plants; flower parterres which are designed around some principles and are easy to maintain. Thus, the cold and monotonous effect of hard floors should be broken. There should be walking paths linking functional areas within the school garden and providing walking opportunities in the fresh air (http://www.meb.gov.tr).

Moreover, school gardens in Turkey are not deemed to be sufficient by the users and school administrations in terms of landscape characteristics. These spaces do not bear features that enable students enhance their physical activities. Unfortunately, involving natural landscape elements such as plants, water and soil in outdoor spaces of the schools is at minimum level. Parents and school administrations demand landscape features be enhanced (Özdemir and Yılmaz 2009).

The objective of this study is evaluating the landscape status of the school gardens located in İzmit, central district of Kocaeli province, and specifying the sufficiency and the deficiencies in practise. The absence or inadequacy of standard criteria for the landscaping of school gardens in Turkey has been a limiting factor in the study. The evaluations have been carried out in line with the principles of school garden designing regulations of the Ministry of National Education and the criterion of 25m^2 minimum garden area per student (Akdoğan,1972), which is applied in many countries.

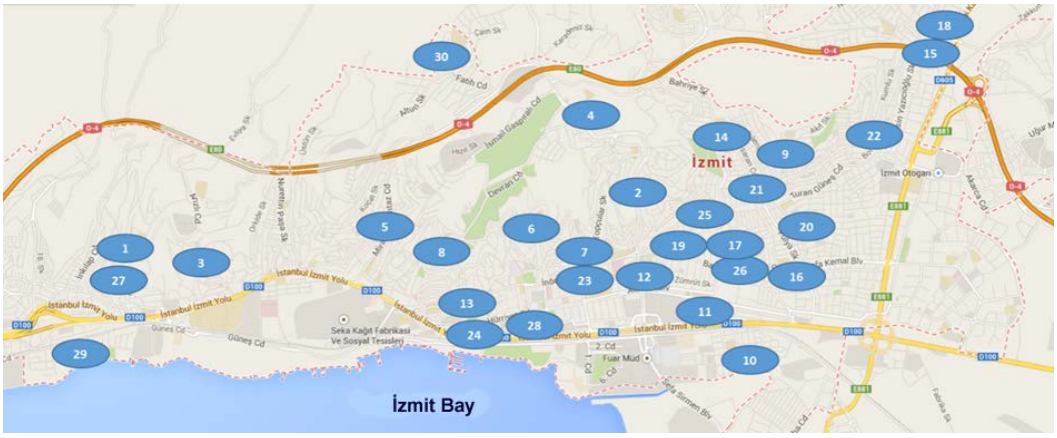
2. MATERIALS and METHODS

2.1. Materials

The study was carried out among 30 primary schools and 19 high schools and their equivalents located in İzmit, the central district of Kocaeli Province, between the years 2013-2014. Kocaeli Province is located in the Marmara Region and surrounded with Black Sea in the north; Bursa in the south; İstanbul in the west and northwest; Sakarya in the east (Figure 1). The Province consists of 12 districts including central district İzmit. The central district, İzmit, is a coastal settlement near the eastern end of İzmit Bay. Data, visuals and observations derived through field studies carried out at schools which are located in the İzmit district; documents obtained from the administrations of each school and Kocaeli Provincial Directorate of National Education and previous researches that had been carried out on the subject matter form the main material of the study.

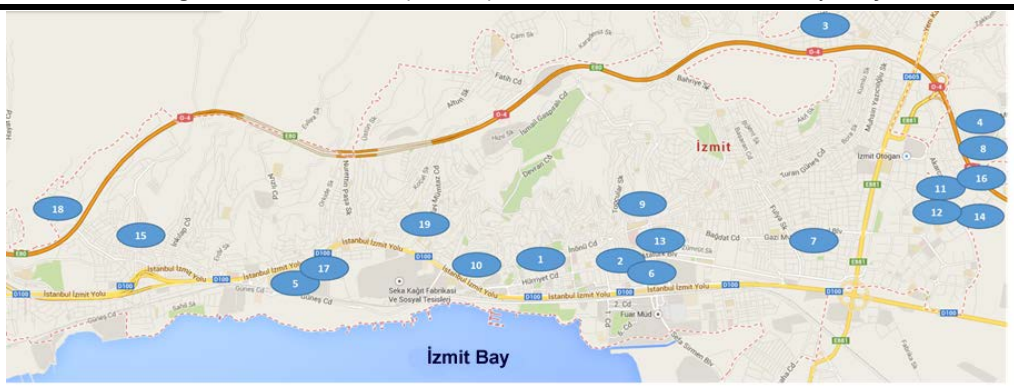
Figure 1. Geographical location of Kocaeli

There are 142 schools located in İzmit, the central district of Kocaeli province. 9 of these schools are nursery schools, 51 are primary schools, 43 are secondary, 20 of them are high schools and 10 are vocational training centres. All the primary schools and high schools with their equivalents in İzmit have been covered within this study. However schools with insufficient data have been excluded. Therefore, 59 % of the primary schools and 95 % of the high schools and their equivalents have been included within the study. Figure 2 and 3 indicate the locations of Primary and High Schools and Their Equivalents respectively included in the study.



1. Zafer Primary School (P.S), **2.**Topçular P.S, **3.** Yenimahalle P.S, **4.** Muammer Aksoy P.S, **5.** İnkılap P.S, **6.** Akşemsettin P.S, **7.** Mehmet Akif P.S, **8.** Ertuğrul Gazi P.S, **9.** İbrahim Süreyye Yiğit P.S, **10.** Türk Pireli P.S, **11.** Atatürk P.S, **12.** 28 Haziran P.S, **13.** Akçakoca P.S, **14.** Ulubatlı Hasan P.S, **15.** Yarb. Refik Cesur P.S, **16.** Albay İbrahim Karaoğlanoğlu P.S, **17.** Kazım Karabekir P.S, **18.** Dr. Ferdi Koçal P.S, **19.** Fevzi Çakmak P.S, **20.** Mimar Sinan P.S, **21.** Leyla Atakan P.S, **22.** Tavşantepe P.S, **23.** Saraybahçe P.S, **24.** 50.Yıl Cumhuriyet P.S, **25.** Bekirpaşa Vakıf P.S, **26.** İbni Sina P.S, **27.** Mehmetçik P.S, **28.** Ulugazi P.S, **29**. 75.Yıl Cumhuriyet P.S, **30.** Özel Atafen P.S

Figure 2. Location of Primary School



1.İzmit High School (H.S)., **2.** Vocational H.S , **3.** İzmit Mualllim Naci H.S., **4.** Ataturk Technical and Vocational H.S., **5.** Cahit Elginkan H.S., **6.** Kocaeli Medical Vocational H.S, **7.** Namık Kemal H.S., **8.** Sabancı Technical and Vocational H.S., **9.** Mimar Sinan H.S., **10.** İzmit Girls' Vocational High School, **11.** 24 Kasım H.S., **12.** İzmit Trade Vocational H. S., **13.** İzmit Atılım H.S., **14.** Yahya Kaptan H.S., **15.** Kocaeli Tourism Vocational H.S., **16.** İzmit Başöğretmen H.S., **17.** Muammer Dereli Teacher Training H.S., **18.** Özel Marmara 2000 H.S., **19.** İnkılap H.S.

Figure 3. Location of High Schools and Their Equivalents

2.2 Methods

In order to obtain space data, primarily, a space data form has been created. Observation, research and scoring data from picked schools and the original data from school administration interviews has been recorded in the form. Space data include space use information from schools and information related to vegetal and landscape design reinforcement components. The data concerning the space size of the schools have been derived from Kocaeli Provincial Education Directorate and the data related to the number of registered students from school administrations. The space use profile, the type and number of landscape design components and the type of vegetal use have been acquired through on-site observations, researches and inventory under consent of the school administrations. While specifying the type of the samples taken from existing plants in green spaces of the schools, the following sources has been used: Davis, 1965-1988; Krussmann, 1984-1986; Yaltırık, 1988; Pamay, 1992; Pamay 1993; Brand 1997-2001; Mataracı 2002; Evans, 2005; Mamıkoğlu, 2007". While analysing space use of the schools, rational range method has been utilized. On the other hand, the data related to vegetal and landscape design reinforcement components have been analysed through frequency distribution method.

3. RESEARCH FINDINGS

3.1. Findings relating space use

Total education period in primary schools is 8 years and compulsory primary education includes pupils between the ages 6-14. Table 1 indicates the space use and amount of space per student in primary schools included within this study.

Table 1. Space use and amount of space per student in primary schools

Name of the Primary School	Number of the students	Total space (m^2)	Total indoor space (m^2)	Total outdoor space (m^2)	Total green space (m^2)	Total space per person(m^2)	Indoor space per person (m^2)	Outdoor space per person (m^2)	Green space per person (m^2)
Zafer P.S	663	3324	1200	2124	50	5.01	1.81	3.20	0.07
Topçular P.S	655	4750	750	4000	200	7.25	1.14	6.11	0.30
Yenimah P.S	400	6450	1450	5000	2500	16.12	3.62	12.5	**6.25****

Muammer Aksoy P.S	350	3000	1200	1800	-	8.57	3.43	5.14	-
İnkılap P.S	1000	4414	1024	3390	800	4.41	1.02	3.39	0.8
Akşemsettin P.S	420	940	200	740	-	2.24	0.48	1.76	-
Mehmet Akif P.S	672	2544	650	1894	86	3.79	0.97	2.82	0.12
Ertuğrul Gazi P.S	310	500	350	150	-	1.61	1.12	**0.48***	-
İbrahim Sür. Yiğit İO	496	8000	750	7250	500	16.13	1.51	14.62	1.01
Türk Pireli P.S	750	10000	6000	4000	2000	13.33	0.8	5.33	2.66
Atatürk P.S	436	2452	1650	802	70	5.62	3.78	1.83	0.16
28 Haziran P.S	1062	7000	4000	3000	-	6.59	3.76	2.82	-
Akçakoca P.S	204	1760	1000	760	-	8.63	**4.90****	3.72	-
Ulubatlı Hasan P.S	435	7500	1000	6500	500	17.24	2.30	14.94	1.14
Yarbay Refik Cesur P.S	1059	6529	829	5700	50	6.16	0.78	5.38	0.04
Albay İbrahim Kara. P.S	717	5050	1250	3800	-	7.04	1.74	5.30	-
Kazım Karabekir P.S	1031	6960	1400	2160	20	6.75	1.36	2.09	**0.02***
Dr. Ferdi Koçal P.S	596	2500	900	1600	600	4.19	1.51	2.68	1.0
Fevzi Çakmak P.S	776	2600	1200	1400	-	3.35	1.55	1.55	-
Mimar Sinan P.S	2115	4412	722	3690	-	2.08	**0.34***	1.74	-
Leyla Atakan P.S	1315	4000	1000	3000	-	3.04	0.76	2.28	-
Tavşantepe P.S	1318	4300	550	3750	-	3.26	0.42	2.84	-
Saraybahçe P.S	327	3405	643	2762	-	10.41	1.96	8.44	-
50.Yıl Cumhuriyet P.S	1544	1962	1722	240	-	**1.27***	1.11	0.15	-
Bekirpaşa Vakıf P.S	568	4875	650	4225	-	8.58	1.14	7.44	-
İbni Sina P.S	400	3500	1570	1930	-	8.75	3.92	4.82	-
Mehmetçik P.S	652	2600	1300	1300	-	3.99	1.99	1.99	-
Ulugazi P.S	2065	3621	1821	1800	-	1.75	0.88	0.87	-
75.Yıl Cumhuriyet P.S	226	3300	300	3000	1000	14.60	1.33	13.27	4.42
Özel Atafen P.S	765	30,000	3000	27000	-	**39.22***	3.92	**35.29***	-
TOTAL	**23.327**	**152.248**	**40.081**	**108.767**	**8376**	**223.24**	**55.35**	**174.79**	**17.99**

*Minimum, ** Maximum

As indicated in Table 1, total number of registered students in the 30 primary schools in 2013 located in İzmit, the central district of Kocaeli Province, is 23327. The total indoor and outdoor space of the schools is **152248 m^2,** whereas total indoor space sum is **40081 m^2** and outdoor space is **108767** m^2, **8376 m^2** of which is green space. The maximum amount of space per student for total indoor spaces is 39.22 m^2 whereas for outdoor spaces it is 35.29 m^2 and 6.25 m^2 for green spaces.

Figure 4 indicates the maximum and minimum rates of spaces per person. Accordingly, when schools are compared in terms of outdoor space, the maximum outdoor space rate is nearly 74 times bigger than the minimum rate. When the schools are compared in terms of green space presence, this difference becomes nearly 313 times.

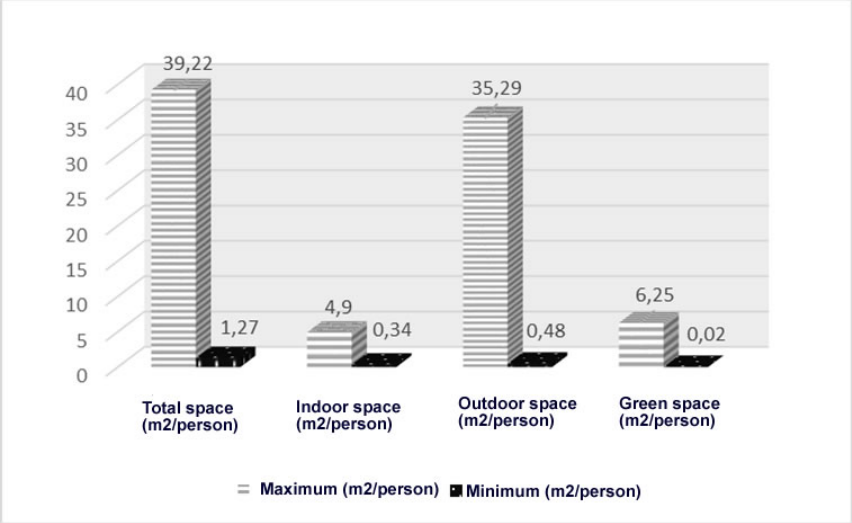


Figure 4. Maximum and minimum rates of space per person (Primary Schools)

High schools and their equivalents cover teenagers. Similarly, for an efficient learning environment, environmental factors need to be well organised.
Table 2 indicates space use data of 19 high schools and their equivalents located in İzmit, central district of Kocaeli Province.

Table 2. Space use and amount of space per student in high schools and their equivalents

Name of the School	**Number of the students**	**Total space (m^2)**	**Total indoor space (m^2)**	**Total outdoor space (m^2)**	**Total green space (m^2)**	**Total space per person(m^2)**	**Indoor space per person (m^2)**	**Outdoor space per person (m^2)**	**Green space per person (m^2)**
İzmit H.S.	650	7123	1000	6123	1000	10.96	1.54	9.42	1.54
Endüstri Meslek H.S	3187	35435	9928	25507	-	11.12	3.12	8.00	-
İzmit Mualllim Naci H.S	332	7000	1000	6000	1000	21.08	3.01	18.07	-
Ataturk Tech. and Voc. H.S	1506	55000	42000	13000	-	36.52	27.89	8.63	-
Cahit ElginkanAnadolu H.S.	763	16500	8100	8400	1200	21.63	10.62	11.00	1.57
Kocaeli Medical Voc. H.S	420	3400	640	2760	2000	8.09	**1.52***	6.57	4.76
Namık Kemal H.S.	615	7132	1500	5632	-	11.60	2.44	9.16	-
Mimar Sinan H.S.	826	6445	1728	4717	-	7.80	2.09	5.71	-
İzmit Girls' Vocational H.S.	1400	15000	13500	1500	-	8.42	9.64	1.07	-
Sabancı Tech. and Voc. H.S	549	15000	5000	10000	1000	27.32	9.11	18.21	1.82
24 Kasım H.S.	570	7719	2719	5000	3000	13.54	4.77	8.77	5.26
İzmit Trade Vocational H.S	1050	10383	2256	8127	-	9.89	2.15	7.74	-
Inkılap H.S.	393	3337	1000	2337	300	8.49	2.54	5.95	0.76
İzmit Atılım H.S.	700	11500	6500	5000	4500	16.43	9.28	7.14	6.42
Yahya Kaptan H.S.	850	15300	8349	6951	836	18.00	9.82	8.18	0.98
Kocaeli Tourism Voc. H.S	217	920	735	185	30	4.24	3.39	**0.85***	**0.14***
İzmit Başöğretmen H.S.	278	860	530	330	150	**3.09***	1.90	1.19	0.54
Muammer Dereli Teach..T. H.S	456	26000	15500	10500	-	**57.01****	**33.99****	**23.02****	-
Özel Marmara 2000 H.S.	250	12000	8000	4000	2000	48.00	32.00	16.00	**8.00****
TOTAL	**15012**	**249002**	**129985**	**126069**	**17016**	**343.23**	**170.82**	**174.68**	**31.79**

*Minimum, ** Maximum

As Table 2 indicates, total registered student number of 19 high schools and their equivalents in 2013 is **15012**. The total indoor and outdoor space of the schools is **249002 m^2;** whereas total indoor space sum is **129985 m^2** and outdoor space is **126069** m^2, **17016 m^2** of which is green space. The maximum amount of space per student (m^2/student) for total spaces is 57.01 m^2 whereas for indoor spaces it is 33.99 m^2, 23.02 m^2 for outdoor spaces and 8.00 m^2 for green spaces.

When schools are compared in terms of outdoor space, the maximum outdoor space rate is nearly 27 times bigger than the minimum rate. When the schools are compared in terms of green space presence, this difference becomes nearly 57 times (Figure 5).

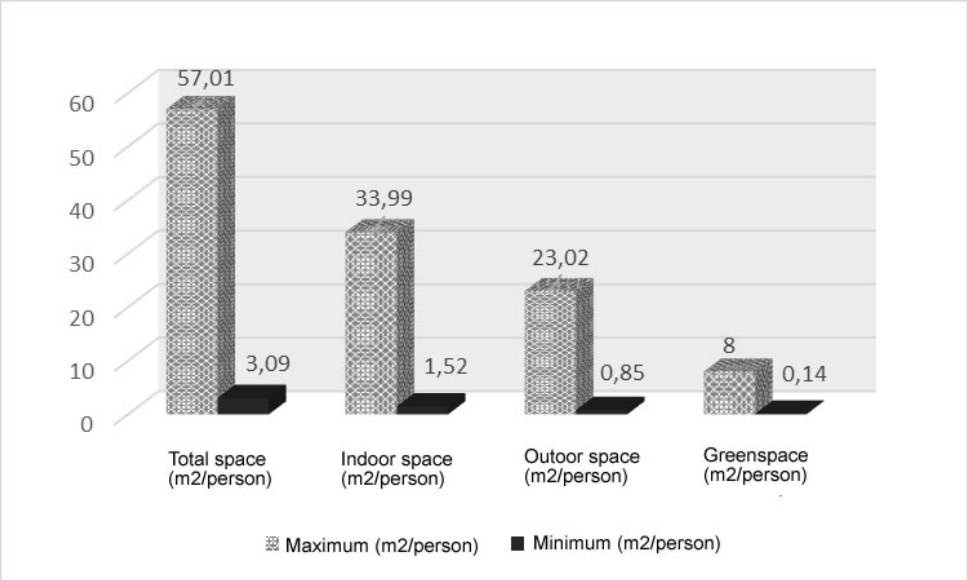


Figure 5. Maximum and minimum rates of space per person (High Schools and their equivalents)

3.2. Findings related to landscape reinforcement components

School gardens should have areas and components that enable students to perform activities such as running; climbing; jumping; walking; playing with water, sand and soil. The current status of primary schools in terms of reinforcement elements are presented in Table 3. The following formula has been used in determining the use rates of the reinforcement components:

$$\text{Components use rate for schools (\%)} = \frac{\text{Total number of components in each school x 100}}{\text{Total number of components in all schools}}$$

Table 3. Reinforcement element diversity and use rates in primary schools

Name of the school	The effigy of Atatürk	Flagpole	Park benches	Lightening elements	Litterbins	Swing	Slide	Play groups	Picnic tables	Seesaw	Arbour	Decorative pools	Fountains	Basketball court	Swimming pool	Chessboard grounds	Total	Reinforcement element use rates (%)
Zafer P.S	1	2	6	2	8	-	-	-	-	-	-	-	1	-	-	-	20	3.19
Topçular P.S	1	2	4	5	7	-	-	-	-	-	1	-	3	-	-	-	23	3.67
Yenimah P.S	1	1	-	3	12	-	-	-	-	-	-	-	1	-	-	-	18	2.87
Muammer Aksoy P.S	1	2	5	8	2	-	-	-	-	-	-	-	-	-	-	-	18	2.87
İnkılap P.S	1	3	6	-	4	-	-	-	-	-	-	-	-	-	-	-	14	2.23
Akşemsettin P.S	-	1	-	-	2	-	-	-	-	-	-	-	3	-	-	-	6	0.96
Mehmet Akif P.S	1	1	10	3	5	-	-	-	-	-	-	-	-	-	-	-	20	3.19
Ert. Gazi P.S	1	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	4	**0.64***
İbrahim Sür. Yiğit P.S	1	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	4	**0.64***

Türk Pireli P.S	1	1	10	-	15	1	1	-	-	-	1	-	-	-	-	-	30	4.78
Atatürk P.S	1	1	6	-	3	-	-	-	-	-	1	-	-	-	-	-	12	1.91
28 Haziran P.S	1	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	5	0.80
Akçakoca P.S	1	1	-	4	1	-	-	-	-	-	-	-	-	-	-	-	7	1.12
Ulubatlı Hasan P.S	1	1	2	-	1	1	1	-	-	-	-	-	-	-	-	-	7	1.12
Yarb. Refik Cesur P.S	1	2	5	5	5	-	-	-	-	-	-	-	-	-	-	-	18	2.87
Albay İbr.Kara. P.S	1	1	3	-	3	-	-	-	-	-	-	-	2	-	-	-	10	1.60
Kazım Karabek. P.S	1	2	-	4	5	-	-	-	-	-	-	-	2	-	-	-	14	2.23
Dr. Ferdi Koçal P.S	1	2	8	5	8	-	-	-	-	-	-	-	2	-	-	-	26	4.15
Fevzi Çakmak P.S	1	1	4	2	2	-	-	-	-	-	-	-	1	-	-	-	11	1.75
Mim Sinan P.S	1	2		3	3	2	-	-	-	-	-	-	-	-	-	-	11	1.75
Leyla Atakan P.S	1	2	5	2	4	-	-	-	-	-	-	-	-	-	-	-	14	2.23
Tavşantepe P.S	1	1	-	-	2	-	-	-	-	-	-	-	5	-	-	-	9	1.44
Saraybahçe P.S	1	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	5	0.80
50.Yıl Cumh P.S	1	1	-	4	6	-	-	-	-	-	-	-	-	-	-	-	12	1.91
Bekirpaşa Vakıf P.S	1	2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	6	0.96
İbni Sina P.S	1	3	10	5	3	-	-	-	-	-	1	-	1	-	-	-	24	3.83
Mehmetçik P.S	1	1	3	2	2	-	-	-	-	-	-	-	1	-	-	-	10	1.59
Ulugazi P.S	1	3	10	4	10	-	-	1	-	-	-	-	-	-	-	-	29	4.63
75.Yıl Cumh P.S	1	1	20	4	5	-	-	-	-	-	-	-	2	-	-	-	33	5.26
Özel Atafen P.S	2	5	50	50	70	2	2	1	6	1	2	1	10	3	1	1	**207**	**33.01****
TOTAL	30	50	167	115	200	6	4	2	6	1	6	1	34	3	1	1	**627**	**100.00**

*Minimum, ** Maximum

As the data in Table 3 indicates, playgrounds and their components which are essential for the school gardens, where the children are expected to meet their needs for playing games, are insufficient in many of the schools. Reinforcement elements that exist in all of the studied primary schools (100 %) are “The effigy of Atatürk, flagpole and litterbins”. The rate of benches and lightening elements are 60 %; fountains 43 %; arbours 16 %; swings 13 % and slides 10 %. The rate of playgroups, picnic tables, seesaws, decorative pools, basketball courts, swimming pools, chessboard grounds are only 3 %. Maximum use rate for the reinforcement elements belong to a private school with the rate 33.01 % whereas minimum rate is 0.64 %.

Table 4 indicates the reinforcement element status of high schools and their equivalents. According to the presented data, reinforcement elements that exist in all of the studied high schools and their equivalents (100 %) are “The effigy of Atatürk and flagpole”. The rate of benches is 84%; lightening elements 79%; litterbins 74%; basketball courts 47%; basketball and volleyball court 47%; fountains 42%; football field 37%; volleyball court 32%; arbour and containers 26%; picnic tables 21%; playpen, swimming pool and bicycle lot 5%. Maximum use rate for the reinforcement

elements in high schools and their equivalents is 24.94 % whereas minimum use rate is 0.47 %.

Table 4. Reinforcement element diversity and use rates in high schools and their equivalents

Name of the School	Ine emgy or Atatürk	Flagpole	Park benches	Lightening elements	Litterbins	Playpen	Picnic table	Arbour	Football field	Fountains	Basketball court	Volleyball court	volleyball+ Football	Container	Swimming pool	Bicycle parking lot	Total	Reinforcement element use rates %
İzmit H.S.	1	2	20	2	12	-	-	1	1	-	1	1	-	-	-	-	41	4.85
Endüstri Meslek H.S	1	1	30	13	10	-	-	1	1	1	1	1	-	-	-	-	60	7.09
İzmit Mualllim Naci H.S	1	1	20	8	-	-	-	-	-	-	-	-	1	2	-	-	33	3.90
Ataturk Tech. and Voc. H.S	1	2	12	5	20	-	10	-	-	-	-	-	1	-	-	-	51	6.03
Cahit ElginkanAnadolu H.S.	1	1	20	20	20	1	4	-	-	-	-	-	-	-	-	-	67	7.92
Kocaeli Medical Voc. H.S	1	2	15	3	-	-	-	-	-	2	-	-	1	-	-	-	24	2.84
Namık Kemal H.S.	1	2	20	5	10	-	-	1	-	-	-	-	-	-	-	-	39	4.61
Mimar Sinan H.S.	1	1	15	10	-	-	-	1	1	-	2	-	-	3	-	-	34	4.02
İzmit Girls' Vocational H.S.	1	1	10	15	10	-	-	-	-	-	1	-	-	-	-	-	38	4.49
Sabancı Tech. and Voc. H.S	1	1	30	15	10	-	10	-	1	1	1	1	-	-	-	-	71	8.39
24 Kasım H.S.	2	2	6	4	7	-	-	-	1	-	1	1	-	-	-	-	24	2.84
İzmit Trade Vocational H.S	1	2	20	4	7	-	-	-	-	-	-	-	1	-	-	-	35	4.14
Inkılap H.S.	1	1		-	4	-	-	-	-	-	-	-	1	-	-	-	7	0.83
İzmit Atılım H.S.	1	2	30	15	8	-	2	-	1	-	1	1	-	-	-	1	62	7.33
Yahya Kaptan H.S.	1	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	4	**0.47***
Kocaeli Tourism Voc. H.S	1	1	4	-	-	-	-	-	-	-	-	-	1	-	-	-	7	0.83
İzmit Başöğretmen H.S.	1	1	6	-	7	-	-	-	-	-	-	-	1	-	-	-	16	1.88
Muammer Dereli Teach..T. H.S	3	5	50	10 0	50	-	-	-	1	-	1	1	-	-	-	-	21 1	**24.94* ***
Özel Marmara 2000 H.S.	1	2	-	6	6	-	-	1	-	4	-	-	1	-	1	-	22	2.60
TOTAL	22	32	30 8	22 5	18 1	1	26	5	7	8	9	6	9	5	1	1	**84 6**	**100.00**

*Minimum, ** Maximum

3.3. Findings related to vegetal components

Another essential landscape design component in school gardens is vegetation. Plants make important and miscellaneous contribution in creation of outdoor green spaces. Especially in primary school gardens, plants, which are important living components, form a kind of integrity with the playgrounds and provide students different game opportunities, enhance their creativity and enable them to be in touch with the nature (Acar, 1997; Acar, 2003). According to the studies carried on children behaviours, the children who have the opportunity of playing in school gardens that bear more natural characteristics and high landscaping features, become more creative and their learning perceptions are more effective (Özdemir and Yılmaz, 2009). Table 5 shows the plant species used in the gardens of the primary schools examined within the scope of the study.

Table 5. Plant species used in primary school gardens and their rate of use

	Plant species used	Species	
		Number	%
Tree species	*Abies spp Acacia* spp., *Cedrus atlantica, Cupressus spp, Juniperus spp Juglans regia Pinus pinea Pinus nigra Platanus orientalis Populus spp Prunus avium Quercus spp Tilia cordata*	13	52
Small tree species	*Malus floribunda Eriopteria japonica Ficus carica, Morus alba Prunus laurocerasus Punica granatum Pyrus spp. Salix caprea*	8	32
Shrub species	*Nerium oleander Rosa spp. Rosa canina , Chaneomeles japonica*	4	16
Groundcover plants (creeping plants)	**-**	-	-
Grass plant	**-**	-	-
Total		25	100

Table 5 indicates that plant diversity in school gardens are low. Most commonly used plant species seems to be trees when all primary schools considered (52 %). Among the trees, especially tall trees are preferred. It has been understood that shrubs are used slightly with a rate of 16 %. On the other hand, groundcover plants are not preferred. Most commonly preferred races are as follows: *Apocynaceae, Cupressaceae,Fabaceae, Juglandaceae, Lythraceae, Moraceae, Pinaceae, Platanaceae, Rosaceae, Salicaceae and Tiliaceae*.

When compared with primary school gardens, the gardens of high schools and their equivalents are richer in vegetation diversity (Table 6). It has been observed that tree species, especially tall ones, are commonly preferred (54.84) when all high schools and their equivalents considered. Use rate of shrubs is 33.87% whereas use of groundcover plants is less (3.23). *Adoxaceae, Amaryllidaceae. Apocynaceae, Araliaceae, Arecaceae, Berberidaceae, Betulaceae, Buxaceae, Caprifoliaceae, Celastraceae, Cupressaceae, Fabaceae, Garryaceae, Hydrangeaceae, Lamiaceae, Lauraceae, Magnoliaceae, Malvaceae, Oleaceae, Paulowniaceae, Pinaceae, Pittosporaceae, Platanaceae, Poaceae, Rosaceae, Salicaceae, Sapindaceae, Simaroubaceae, Tamaricaceae, Tiliaceae.* It has also been observed that herbaceous plant use is insufficient. Commonly preferred herbaceous plants are *Tagetes* erecta , *Salvia splandens, Viola odorata, Petunia hybrida, Celosia argentea*.

Table 6. Plant species used in the gardens of high schools and their equivalents and their rate of use

	Plant species used	Species	
		Number	%
Tree species	*Ailanthus altissima, Abies nordmannianna, Acacia spp., Acer negundo, Aesculus hippocastanum, Betula pendula, Cedrus deodora, Cedrus libani, Cupressusparis leylandii, Cupressus sempervirens, Chamaecyparis lawsoniana, Fraxinus excelsior, Juniperus orientalis, Juniperus communis, Magnolia grandiflora, Pavlonia tomentosa, Picea excelsa, Picea oriantalis, Picea pungens, Pinus nigra, Pinus slyvestris, Pinus pinea, Pinus brutia, Platanus orientalis, Populus alba, Photinia fraseri, Quercus spp., Robinia pseudoacacia* "Umbraculifera", *Salix babylonica, Thuja occidentalis, Thuja orientalis, Tilia tomentosa, Washingtonia robusta, Washingtonia filifera*	34	54.84

Small tree species	*Acer palmatum, Lagerstroemia indica, Olea eureopeaea, Prunus cerasifera pissardi nigra, Tamarix tetrandra*	5	8.06
Shrub species	*Abelia floribunda, Agave americana, Aucuba japonica, Berberis thunbergii* "Atropurpurea"*, Berberis thunbergii, Buxus sempervirens, Cassia spp., Cortaderia selloana, Eonymus japonicum, Hibiscus syriacus, Hydrangea hortensis, Laurus nobilis, Ligustrum vulgare, Nerium oleander, Prunus laurocerasus, Pitosporrum tobira, Pyracantha cocinea, Rosa spp., Rosmarinus officinalis, Spirea vanhoutteii, Viburnum opulus*	21	33.87
Groundcover plants (creeping plants)	*Hedera helix, Juniperus horizontalis*	2	3.23
Grass plant	-	-	-
Total		62	100

On the other hand, it has been observed that school gardens of both primary schools and high schools and their equivalents are designed to be used for parking, walking and for official ceremonies. Therefore, use of hard soil in outdoor spaces is widespread and most commonly preferred construction material for mentioned hard soil is asphalt. Besides, use of school gardens by the students during holiday periods prohibited. In schools that have green spaces, plants are generally cared by school staff such as the retainers or furnace stokers due to limited financial source and labour force which prevents the plants be cared regularly and consciously.

4. DISCUSSION and CONCLUSIONS

School gardens are education centred spaces that enable students to learn about plants, wildlife and their relation and enrich the schools visually in addition to vitalising school buildings. Well- designed school gardens include lots of important educational materials and they give chance to various teaching strategies. Besides their positive effects on education, school gardens make serious contribution to urban ecology, urban green space organisation, urban aesthetic etc. In order to be able to fulfil their mentioned functions, school gardens should be implemented with landscape design and maintenance of the design should be guaranteed. In a good design, live components (plants) and non-living components (reinforcing elements, floor elements etc.) should be applied in accordance with a design created considering some principles.

In this study, current space use (including outdoor green spaces and indoor spaces) of 49 schools located in İzmit, central district of Kocaeli Province; current diversity statuses of reinforcing elements and vegetal components have been specified and their landscape design has been evaluated.

It has been ascertained that the majority of the indoor spaces of the primary schools, high schools and their equivalents located in İzmit consist of the school building and no other indoor space for sports activities, recreation, research and social activities exist. It has also been concluded that the amount of parade grounds, recreational areas, parking lots, playgrounds and sports courts, outdoor classrooms and areas for performance are either insufficient or do not exist. In the majority of the school gardens concrete hard floors designed as parade grounds are also used as areas for students to meet play and sport's needs. However, according to the principles regarding the designing of the school gardens by The Ministry of National Education

besides educational structures and students' hostels at boarding schools, schools should have amphitheatres and suitable areas for outdoor classes, at least one volleyball court and one basketball court, indoor sports hall and a miniature football pitch, playgrounds for traditional children games, walking paths and parade areas providing a space of at least 2 m^2 for each student (http://www.meb.gov.tr)

Akdoğan,(1972) states that the standards for school gardens offer a minimum amount of 25 m^2 space per student and this standard is considered in many countries. Among the schools studied, only one primary school is in accordance with this standard with 39.22 m^2 space per person. In this case, only 3.3% of primary schools in İzmit is applicable to this standard. As for high schools and their equivalents, 21.05% of the schools are in accordance with the standard and maximum rate is 57.01 m^2/person.

The Ministry state that school gardens should also include as much as possible green areas; ecologically compatible plants; flower parterres which are designed around some principles and are easy to maintain. (http://www.meb.gov.tr) Thus, the cold and monotonous effect of hard floors should be broken yet the schools located in İzmit are insufficient in terms of open-green space per student. Only 43.33 % of the primary schools and 57.89 % of the high schools and their equivalents involved in the study have green spaces. The rest of the schools do not have green spaces when their outdoor spaces considered. Hence, in his study concerning the effects of playgrounds utilised in school gardens on children, Young (1997) emphasises that those playgrounds to be utilised in school gardens should be composed of encouraging elements besides evoking curiosity in children. On the other hand, in his study on transforming school gardens into learning environments, Takahashi (1999) states the school gardens to have great potential in terms of learning. Indeed, Aksu and Demirel (2011), state that due to intense urbanisation, outdoor playgrounds of children are gradually disappearing and existing or recently constructed playgrounds are insufficient. They also emphasize that children are growing being deprived of gaming activities which is essential for healthy development of them. Therefore, they state, one of the most important function of school gardens is meeting this gaming need of the children. Wagner (2000) states that schools having sufficient green space, are able to form more flexible learning environments. Bell et al. (2006) emphasises that school gardens which are rich in green spaces enhance the quality of physical activities. In addition, Subramaniam, (2002) states that students attending the schools having sufficient green space have greater enthusiasm and interest in learning.
The Ministry also states that every school garden necessarily has a space for Ataturk's Bust and flag posts, design components such as appropriate game tools and equipment for the age groups, arbours, sitting areas and sitting groups. (http://www.meb.gov.tr) Only 6.66% of the primary schools in İzmit have playgroups; 13.33% have swings and 10% have slides. On the other hand, none of the primary schools have basketball courts or swimming pools. As for high schools and their equivalents, 42% have basketball courts; 31.5% have volleyball courts; 47% have multipurpose fields suitable for both basketball and volleyball; 5% have swimming pools. Moreover, it has been ascertained that most of the school gardens are covered with hard materials (concrete-asphalt-paving stone etc.), plants have been rarely used and vegetation cover almost does not exist. Commonly an unsuccessful planting is carried out with seasonal flowers around the effigy of Atatürk and often, landscaping of the effigy is deemed to be fulfilled. Unfortunately neither shrubs nor groundcover plants are involved sufficiently. These findings are similar to previous studies. In his study Özdemir (2011) carried out in Bartın Province states that primary school gardens are insufficient in terms of structure, landscape design, reinforcement components and green spaces. Although the borders of the gardens are vegetated, they are formed as concrete, asphalt or dusty-muddy spaces. Özdemir also states that the gardens are

used as car parks during spare times. Similarly Pickard (2002), argues that while planning school gardens, areas for team games, playfields with firm ground, informal social spaces and habitat areas should be regarded. Karakaya and Kiper (2013), state that the gardens of most of the primary schools in Tekirdağ are covered with concrete and asphalt and have poor layouts in terms of plants and reinforcement components. In a study concerning the restoration of a Primary School Graden located in Canada Penner (2000), states that designing school gardens as healthier, liveable, positive environments with modern educational and recreational opportunities through natural outdoor space layouts is necessary to enhance the life quality of children.

Çelik (2012) emphasises that the gardens of pre-school educations institutions in Kocaeli are not used effectively and during environmental planning, outdoor space planning is ignored. On the other hand Erdönmez (2007) states that the experience and information obtained through the games inside the school gardens during the break times by the child are as important as the other information gained through other educational means and school itself. In their study concerning the contribution of school gardens to education in Canada, Collyer et al. (2001) state that various kinds of trees, shrubs and natural plants were planted in 6 school gardens upon the requests by the educators, students and people. Moreover, these mentioned gardens were provided with grass areas, decorative pools and vegetable gardens and they were furnished with several statues. Thus, they state, subjects included in the curriculum were put into practice and the students were able to play in a healthier and safer environment. Corson (2003), emphasises that learning is not limited to the indoor spaces at school. Outdoor spaces have great potential as learning environments. Great numbers of new-built schools in America have been designed with this awareness including amphitheatres, outdoor areas dedicated to musical and painting activities, gardens, weather stations. Different topographical features and vegetation have also been considered during this mentioned design process.

There are great differences between the schools located in İzmit in terms of open space and green space existence so much so that it has been specified that the difference between the school with the largest open space and the school with the least open space is 74 times higher in primary schools and 27 times higher in high schools and their equivalents. Similarly, the difference when green space considered has been specified to be 313 times higher in primary school while it is 57 times higher in high schools and their equivalents. It is not possible to mention about a balanced practise in terms of reinforcement component and plant use when there is not a standard in the amount of open space per person.

Consequently, it is obvious that the school gardens in İzmit do not have either appropriate space use, components or plant use that provide students with game activities. All the school gardens, without any exception, should be regarded as a part of education and training; a uniform standard should be adopted in the organisation of spaces and components in order to ensure that all students have equal access to education and training opportunities; the space organization in school gardens should be designed to address various age groups and green spaces and attractive vegetative design that offer students the opportunity to relax and to deepen the understanding of the ecological system should be employed.

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