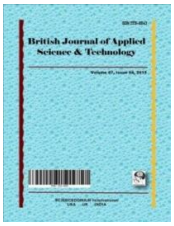

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Landscape Project for a School Garden: The Case of SAIK High School, Isparta-Turkey

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Authors' contributions

This work was carried out in collaboration between both authors. Authors CKS and AE designed the study, performed the site visits and prepared a landscape project. Author CKS managed the literature searches, wrote the first draft of the manuscript and conducted controls throughout study. Both authors read and approved the final manuscript.

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ABSTRACT

School gardens are a space and tool for students to be healthy development. Students spend a large part of their day at school. In this sense, the garden of Sehit Ali Ihsan Kalmaz (SAIK) High School was redesigned with the requests of the Provincial Special Administration of Isparta City, Turkey. The project has aimed to explore the relative importance of the schoolyard and the educational philosophy adopted by the school. Therefore, the current structure of schoolyard was carefully analyzed, and some interviews were organized with the school administrators, teachers, staff and students. After the determining demand, needs and expectations, the assessments have begun to issue a site project. After that, a landscape project prepared including for not only general school garden activities such as ceremony events or recreational facilities, but also supporting educational activities with ecologic approaches. However, some restoration and redesigned of current structures have also been considered for improving garden properties.

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1. INTRODUCTION

Children are spending a large part of their day at school. In this sense, the school gardens are important subject and integral parts for school plans [1]. However, school gardens could be design in different forms and sizes, with varying aims. Typically, it consists of sport fields, ceremony areas, recreational and sport facilities, flowers, trees so on. Moreover, the utilization of school gardens as a class is a well way to connect students with the natural world and integrate with education [1-4].

It has already well established that school gardens are places where help students to increase understanding of nature and the environment. However, students are become more enthusiastic about attending school, make better grades, and become more knowledgeable about natural processes in well-designed yards [4-6].

However, a schoolyard management need to organize work and lessons, motivate students, and publicize garden achievements. But school administrators have usually not skilled to do all this achievements. Moreover, planning a schoolyard requires not only construction or horticultural knowledge but also landscape design sense for enthusiasm and organizational capacity. Hence, the schoolyards should be diversified and beautified by well landscape design principles.

The former studies clearly have shown that school gardens have a number of benefits. However, students gain self-confidence and a sense of *'capableness'* along with garden based skills and knowledge in playing [6,7]. It has proposed that because students respect the things that feel ownership, graffiti and vandalism have been decreased while students become more fit and healthy as they spend more time active in the open spaces [1,3,6-10].

The design of school and its near environs have become an important issue for Turkish educational system. For that reason, the numerous studies have already conducted for determining various levels of schoolyard properties in Turkey. Hence, different approaches and methodologies have developed for determining current status of schoolyards and some conclusions have issued for improving educational quality. Some of these studies are summarized as follows; Kelkit and Ozel [11] determined general characteristics of schoolyards located in Canakkale City. Özdemir and Yılmaz [12] studied behavior mapping of student activities during recess, physical assessments of schoolyards for Ankara's primary schools. They proposed that the landscape features and physical qualities, and playing activities were similar while students usually prefer spacious and vegetated yards. After detailed study, they have already recommended some landscape design principles for schoolyards. Karakaya and Kiper [13] proposed landscape design criterias for elementary schools located in Edirne City. Özdemir [5] conducted a project on a selected elementary schoolyard in Bartın City, in order to design gardens with pedagogical approach. Another study for Canakkale City was conducted by Sağlık and his friends [14]. They determined demand and needs from school principals, teachers, and parents. Then, a landscape design project including using the open space intended for some activities was prepared. In more recent study, Sahin [4] explored the current status of schoolyards in city of Isparta and recommended potentially useful plant materials for those. Consistently, they stated that schools have usually not meet the needs of students and staff from schoolyards.

However, despite the growing interest on the research of schoolyards, relatively little has been studied about their relationship with physiological promotion, particularly from a landscape perspective. This relationship has the potential of schoolyards to promote health and well-being and to be an integral element of school based promotion strategies. Ralston [15] proposed that although educational philosophy drawn exposes the economic reasons for school garden designs, gardening's were important issue for human well-being with well applied landscape designs.

This article summarizes on research to examine and landscape design practices for a selected public high school garden located in Isparta City, Turkey. This landscape project was requested from Provincial Special Administration of Isparta City that the interests of educators and students could be satisfied, inform and support one another. In this sense we have highlighted important issues for school garden design principles while the landscape practices could

contribute to student's physical, mental, social and spiritual well-being. The findings and suggestions in view of landscape architecture major have already reported to administrators and it could be a sustainable development model policies for other schools.

2. MATERIALS AND METHODS

2.1 Materials

Isparta is a city with population approx. 210.000 where located in the Mediterranean region of Turkey. This area is also called *lakes region* due to many lakes located in that area. The study material is a public high school located in Isparta City center, named *'Sehit Ali Ihsan Kalmaz Anadolu Lisesi'* (SAIK). The name of the school was given in memory of Ali Ihsan Kalmaz in 1960. As effective in 2016, there were 669 students, 42 teachers and 24 classrooms in the school. A landscape design project for that schoolyard was requested from Provincial Special Administration of Isparta City. In this sense, a landscape project for SAIK high school's garden was conducted. In addition, the literature reports and survey for the schoolyards were supported material. Fig. 1 shows location and general view of the SAIK high school and its environs.

2.2 Methods

A number of stages have been followed to examine SAIK's garden in view of landscape architecture major. These stages are; literature review, data collection, face to face interviews and site visits. During the visits, current situation of high school's yard was determined and a meeting was organized with the participation of school administrators, teachers and students to get their proposals. However, research subjects were created by landscape architecture principles suitable to SAIK. It is important to note that there was no any questionnaire prepared or applied to participants. Only some interviews conducted with randomly selected students (approx. 50) and administrators (approx. 10) in order to determine their feeling and demand from yard. Some general questions were asked to participants (i.e. How schoolyards looks like? What you prefer in it? What kinds of playing activities you like and prefer in ? etc.). After determining demand and feelings, it began to work considering to number of students and their ages. The further information on school was also obtained from the Isparta Province National Education Directorate. The study with the observation and interviews had the following headings:

- The location and size of school (number of students, staffs, classrooms and total land area)
- Current situations of schoolyards and its near environs
- Current sportive, ceremony and recreational facilities
- Vehicle parking facilities
- Present landscape values and plant assets
- Demands and expectation from SAIK high school garden

Fig. 1. General views and locations of SAIK high schools

Interviews and site visits were done between months of October 2016 through December 2016. After having information given in above, the landscape design of applications was applied.

3. RESULTS AND DISCUSSION

It has already reported in introduction section that different expectations could be possible from school gardens. This was also a case for SAIK high school. Observation and interviews for SAIK high school displayed large differences between staff and students engaged in. In particular, staff have usually preferred more parking lots and recreational facilities for resting while students have preferred to more open spaces and further sporting areas for playing. This could be expected considering different age and major groups demand different needs. In Fig. 2, some pictures from front garden/open space areas of SAIK's yard presented. It was realized that most parts of the garden had no function established rather than vacant land areas or randomly vehicle parking.

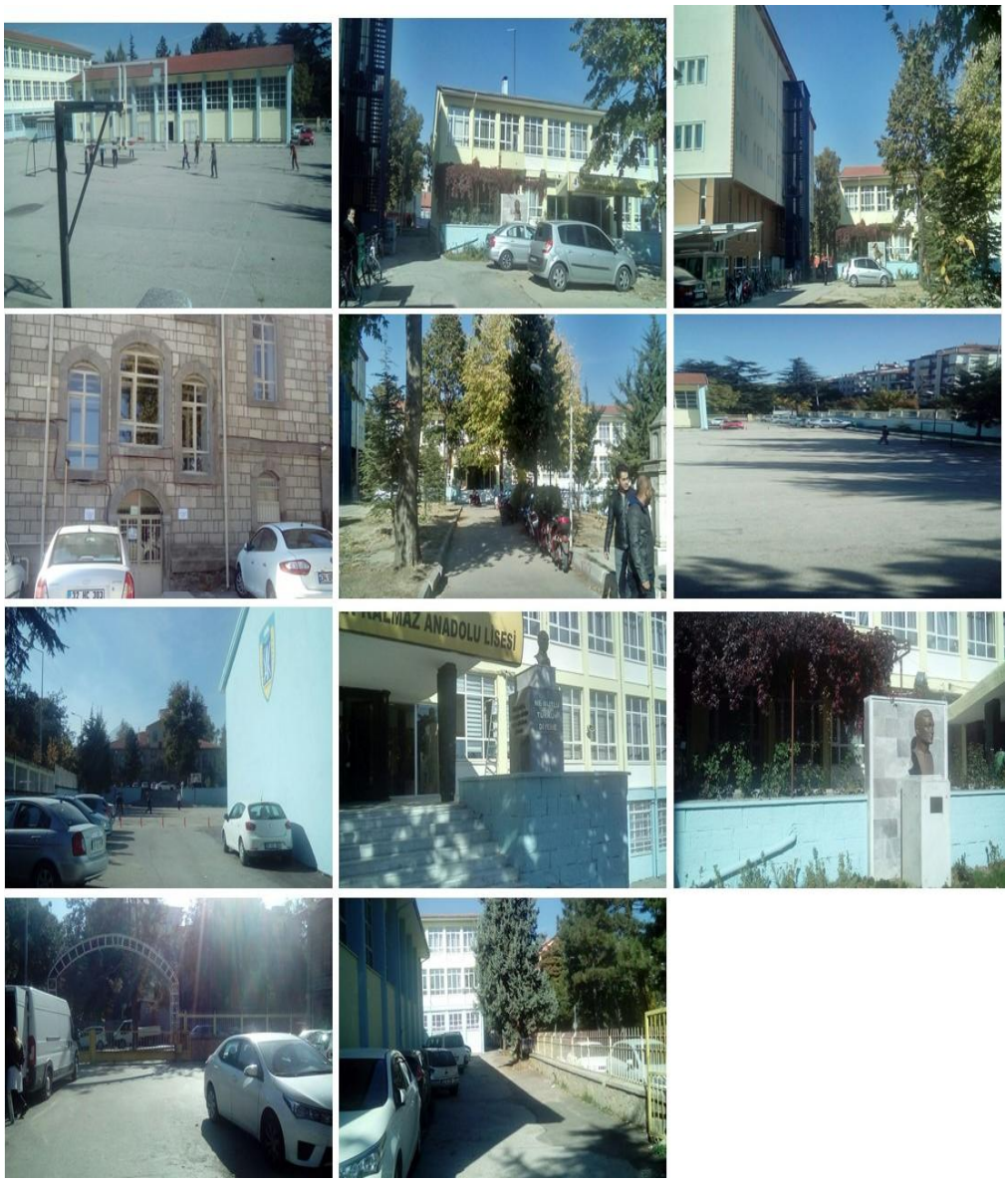

Fig. 2. Current status and view of SAIK high school garden

There are two open spaces in the front area, top and lower yards, realized in school. However, there has no proper boundaries between those and surface covered by hard material (concrete). Hence, the schoolyard has no proper function established rather than open spaces. These two areas utilized by staff and students for recreational, sporting activities and ceremonial purposes all together. This make randomly laid facilities and sporting areas together. In addition, the landscape design practices for school gardens should be regular and functional for all activities (i.e. resting, sporting, playing or ceremony, etc.)

It is a general design criteria for yards that visitors should be provided with access to each field on foot. In a garden, open spaces and playing fields rather than ceremony areas should be designed in an appropriate proportion and a scale should be combined with the plants. However, some plants that high-impact resistant, could be suggested to use. Moreover, evergreen trees and shrubs are also very suitable for the school gardens. It is important to note that high pollen-producing plants should not be considered in that areas.

However, after the determining feelings for SAIK's garden from students and staffs. The current landscape values and plant assets carefully examined during site works. Table 1 shows some structural materials with quantities suggested to use for improving SAIK's garden. Moreover, based on the landscape practices and information given in the literature findings, the list of plants presented in Table 2 are suggested to use in it. The further information on plants

Table 1. Some structural materials suggested to use in the SAIK's garden

The name of job	Material	Unit	Quantity
Ceremony and showground	• Granite flooring, • Marble flooring for Atatürk statue's floor	m² m²	380 33.8
Seating and rest area	• Hexagonal camellia, • Wooden picnic table, • Wooden seats on wall, • Fountain (for restoration)	Number Number m³ Number	2.0 2.0 3.9 1.0
Demonstration area and amphitheater	• Conversion of stairs into amphitheater, • Wooden seats	m³ m²	3.8 40
Vehicle parking	• Vehicle parking lot, • Vehicle parking front wall, • Vehicle exit door, • Wooden plant (located at the border of the parking lot) • Barrier	m³ Number Number Number Number	13 1.0 5.0 16 20
Entrance	• Disabled ramp	m	14.5
Park area	• Bicycle parking platform	m	11.5

Table 2. Plant materials suggested to use in SAIK's garden

Latin name	Common name	Quantity (Number)
Acer platanoides ´Crimson King´	Norway maple	1
Betula pubescens	Downy birch	5
Acer negundo	Ash-leaved maple	1
Berberis thunbergii	Red barberry	9
Rosmarinus officinalis	Rosemary	6
Viburnum tinus	Laurustinus	7
Gaura lindheimeri	Lindheimer's bee blossom	8
Euonymus japonica	Japanese spindle tree	30
Cornus alba	Red twig dogwood	50
Cercissili quastrum	Judas tree	2
Lavandula officinalis	Lavender	6
Forsythia x intermedia	Lynwood Variety	5
Photiniaser ratifolia	Desfontaines	1
Cerastium tomentosa	Snow in Summer	13
Juniperus horizontalis	Creeping juniper	8
Ampelopsis quinquefolia	Virginia creeper	33
Hedera canariensis	Algerian ivy	75

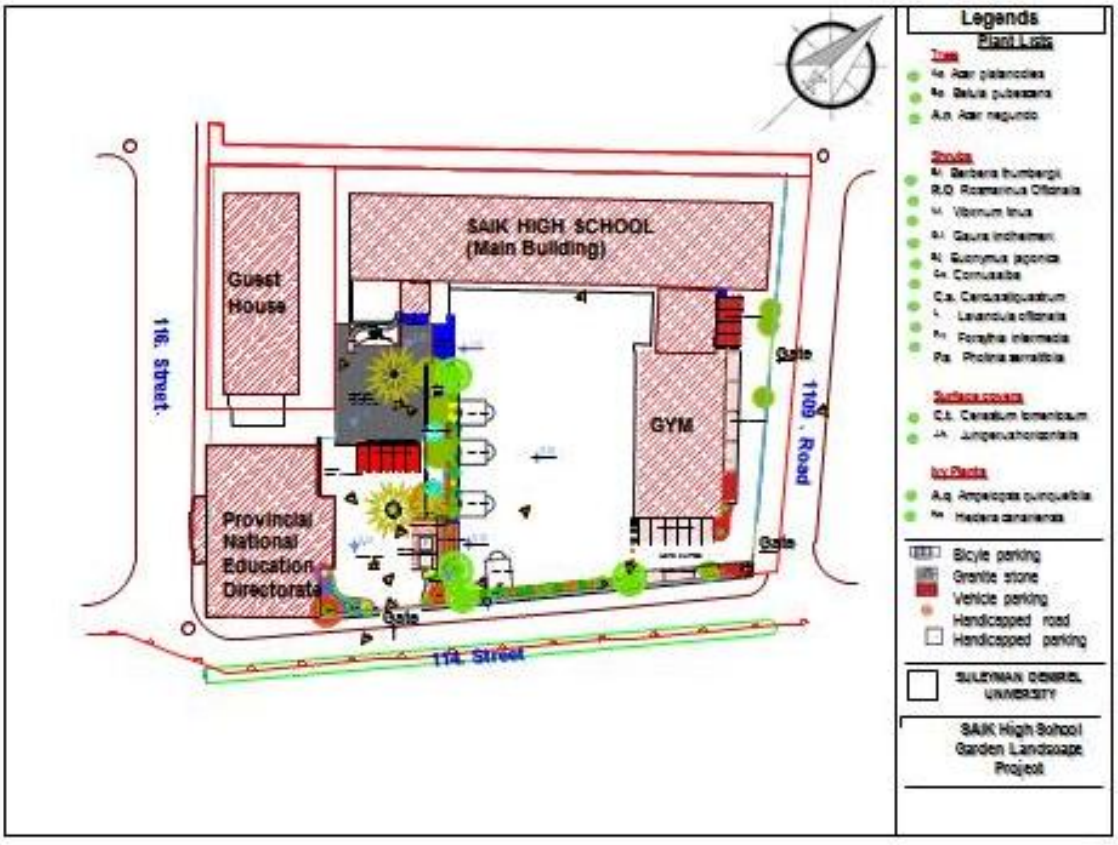

Fig. 3. Landscape project prepared for SAIK high school garden

materials and structural elements that suitable to school gardens should be found elsewhere [4,5, 13]. Finally, a landscape project for SAIK high school garden was prepared and presented in Fig. 3.

3.1 Landscape Architecture Approaches for Improving SAIK High School Garden

It has already mentioned in above that different expectations and demands on school gardens by staff or students. Therefore, the research project on the subject should closely correlated to those needs. In this regard, it is best way to design schoolyard with using basic landscape design approaches. However, it is important to design interior and exterior of schools with realistic sense, versatile functionality and succeeded for most of the staff and students. In summary, enhancing the quality of the schoolyard in the context of the landscape design project have already be finalized as follows:

1. It was found that SAIK's open space had no proper function established rather than vacant land areas. Hence, students should be placed in the upper garden so they have not utilize the area properly where they meet their playing needs in ceremonial space. In addition, the existing Atatürk's statue, which is very close to the main entrance of the building, should be moved to the ceremony area and a planting work should be performed around the statue.
2. In order to distinguish the special areas in ceremony site, the floors should be differentiated. It was calculated to be approx.390 m² area and the granite cubic stone flooring (10x 10x 10 cm) could be appropriate in that area.
3. The current location of Sehit Ali Ihsan Kalmaz's statue (SAIK), near the main entrance of school and not well organized. It should be move to entrance of the garden and could be associated with the sign.

Fig. 4. Landscape project prepared for SAIK high school garden and its parts

4. A number of new seats should be distributed throughout garden. So that they could be utilized for sitting, resting, watching the environment or eating and drinking purposes by staff, students or visitors. In this context, two hexagonal camellia should also be constructed in the upper garden. These might be meet the needs of the all users.
5. A wall of 13x0.6 m should be built to serve as a barrier between the parking and the ceremonial area where located close to the entrance of the building. This wall should be made with concrete and also utilized as additional sitting units.
6. In current situation, there have no any ramp provided for disabled staff or students. Hence, a new disabled ramp should be constructed beside the existing

stairs in the entrance of the building. This could also make the space more accessible.

7. Although there are increasing demand on use of bicycle to reach school by students and staff, there has no any well designed bicycle parking lot present in yard. Therefore, a bicycle parking space should be organized. It should be enough at least 17 bicycle parking during day time.
8. There is also need a well-organized vehicle parking lot. Without proper parking facilities, it makes very crowded and randomly laid cars throughout open space of garden. This is also obstruct pedestrian circulation, inhalation as well as difficulties for leisure activities. In a standard vehicle parking design, a space of 2.5 x 5.0 m should be established. It was suggested that a car parking lot should be capacity of 24 vehicle and additional two disabled car parking near to entrance of building.
9. It has suggested that plastic barriers should be useful in certain places in order to prevent vehicles from ceremonial and recreational areas. Hence, some problems could be avoid from parking to ceremonial and recreational places vice versa. Some plastic barriers could be established for boundary of sport fields, recreational places and plants in SAIK's yard.
10. The current parking lot in the lower garden should be reorganized. In this context, a width of 6.25 m gate could be provided for vehicle exit. So the vehicles should be parked comfortably and the entrance and exit are better to from street to school vice versa.
11. There have no any space found for conversation or activities in yard. It is necessity for socio-cultural activities in the school. It should be near to the garden entrance. However, it looks like very practical to transform stairways in garden to an amphitheater with arrange only first four floors with providing 70 seats.
12. There is a fountain located in middle of garden but not function. This foundation should to be removed and renovated with its value and utilized for the gardeners' water needs.
13. Based on the principles of landscape planning and design criteria's, it is foreseen that planting in the yard has inadequate and arrangement is not proper form. However, it is very important to planting of open spaces for effective use of structural materials and help students to learn nature. The detailed information on plant materials and their use have already given in above.

With having these suggestions and literature findings, a detailed landscape projects for each parts of garden were prepared and presented in Fig. 4.

4. CONCLUSION

The school gardens should be regular and functional for recreation and transportation. The current status of SAIK high school's garden looks like insufficient in general activities such as ceremonies, recreations and supporting educational activities with ecologic approaches. In addition, it contains most of the hard flooring surfaces with insufficient plants and designed areas for vehicles.

It has already well established that the concept of a green space creation is important for students. Hence, green ratio should be more than hard floors and other facilities. However, the insufficient knowledge for basic needs for maintenance and renewal of garden arrangement resulting immortal situations. In addition, necessary knowledge should be supplied from landscape architects. Moreover, well designed schoolyards are important for the resting necessary to improve student wellness. Therefore, architects, landscape architects, urban planners, and educational experts should be worked together to design schools and its environments.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Casey T. School grounds literature review: Phase one of the Scottish school grounds research project. Scotland. 2003;29.
2. Harvey MR. The relationship between children's experiences with vegetation on school grounds and their environmental attitudes. Journal of Environmental Education. 1989;21(2):9-15.
3. Tai L, Haque MT, McLellan G. Designing outdoor environments for children: Landscaping schoolyards, gardens, and playgrounds. Children, Youth and Environments. 2008;18(2):268-271.
4. Sahin CK. The current status of school gardens in city of Isparta, Turkey. International Journal of Engineering Science and Innovative Technology. 2014; 3(3):533-542.
5. Özdemir. A change of a school garden: Bartın Akpınar elementary school landscape project (Turkish, Abstract in English). Inonu University Journal of Art and Design. 2014;1(3):267-276.
6. Bell AC, Dyment JE. Grounds for health: The intersection of green school grounds and health-promoting schools. Environmental Education Research. 2008;14(1):77-90.
7. Malone K, Tranter P. School grounds as sites for learning: Making the most of environmental opportunities. Environmental Education Research. 2003;9(3):283-303.
8. Tandoğan O. More livable school grounds for children (Turkish, Abstract in English), Megaron. 2016;11(4):629-637.
9. Liddicoat KR, Jamila WS, Marianne EK, Keith GT. Sharing programs across cultures: Lessons from Garden Mosaics in South Africa. Children, Youth and Environments. 2007;17(4):237-254.
10. Laurie SM, Faber M, Malebana ME, van den Heever E. Results from a survey on school food gardens in South Africa: Perceptions of teachers, learners and parents ISHS Acta Horticulturae 1007: *II* All Africa Horticulture Congress, 15-20 January, Skukuza, Kruger National Park, South Africa; 2012.
11. Kelkit A, Ozel E. A research on the determination of physical planning of school gardens in Canakkale City. Pakistan Journal of Applied Science. 2003; 3(4):240-246.
12. Ozdemir A, Yılmaz O. Assessment of outdoor school environments and physical activity in Ankara's primary schools. Journal of Environmental Psychology. 2008;28:287-300.
13. Karakaya B, Kiper T. According to landscape design principles determination of current situations of orchards of some elementary school in Edirne City Center. (Turkish, Abstract in English), Journal of Tekirdag Agricultural Faculty. 2013;10(1):59-71.
14. Sağlık A, Sağlık E, Kelkit A. Canakkale Barbaros Sunshine preschool landscape project (Turkish, Abstract in English). Artium. 2015;3(1):39-47.
15. Ralston SJ. It takes a garden project: Dewey and Pudup on the politics of school gardening. Ethics & the Environment. 2011;16(2):1-24.

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