Theses of the doctoral thesis

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MAGYAR AGRÁR- ÉS ÉLETTUDOMÁNYI EGYETEM

Investigating the potential of landscape architecture for environmental education in open spaces of primary schools in Budapest

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RESEARCH HISTORY

In recent years, **child-friendly** ideas have become increasingly popular in landscape architecture and urban planning, and the **importance of school grounds** has been recognised more and more widely at international and national level.

At the same time, **environmental education** is becoming more and more important in national strategies and programmes, as well as in the programmes of educational institutions. School grounds provide an opportunity to **actively engage with the environment** and to **experience what is taught in the classroom in real life**. The need to connect with the outside environment, and ultimately with nature, is also crucial because, as the environmental crisis has progressed, so has **the relationship of humanity with nature weakened:** urbanisation processes have led to more than half of the world's population living in cities, alienated from nature, and this trend is increasing. Also as a result of these processes, **play opportunities in cities have become more restricted**, and most of the children can only play in controlled environments.

Therefore **there is a need for child-friendly outdoor spaces (also) in schools, which are nature-oriented and accessible on a daily basis**, where children can play and learn safely and which at the same time contribute to increasing their environmental sensitivity.

OBJECTIVES

The aim of the research is to explore **how landscape architecture can support environmental education in primary school grounds** and how the environmental education function can be integrated with the traditional functions of sport and play. To do this, I set out to answer the following questions:

1. What are the **characteristics of school grounds that function well in terms of environmental education**?

2. How do the **functions that support environmental education appear in school grounds**?

3. What are the **potentials of school grounds in different contexts**?

4. What are the **criteria for the spatial representation of functions that support environmental education**? Which conditions may provide the opportunity and which conditions may limit it?

5. What are the typical **types of school grounds** regarding environmental education and what are **their characteristics**?

6. What characterises the **use preferences of children** in different schools? Is the impact of different types of school grounds on the users perceptible?

MATERIAL AND METHOD

The research was conducted in three phases. Firstly, to lay the groundwork for subsequent studies, **I investigated the links between school grounds and the primary school curriculum** by studying the current Framework Curriculum for the National Curriculum 2020.

Subsequently, **I developed a method for the environmental education-focused, landscape-architectural investigation of school grounds** based on the Framework Curriculum and the studied domestic and foreign literature, and then I conducted **field studies in the school grounds of 21 primary schools in Budapest** based on the developed criteria. I analysed the data obtained from the field survey using **statistical methods** and created an **environmental education-oriented typology** of school grounds.

In the next phase of the research, I carried out **park use surveys** in **six institutions** with the participation of pupils from the schools selected from each school garden type, involving **386 pupils**. I used the **survey and drawing method**, whereby students were asked to provide drawn and/or written answers to questions about their school garden use and favourite places.

RESULTS

This dissertation highlights the **changing needs of landscape architecture practice in the design of school grounds**. School grounds can provide a range of opportunities to **support educational activities and environmental education**, and to **ensure and strengthen children's connection with nature**. Making school grounds **more nature-oriented** is a **necessary** but sometimes **challenging task**, partly due to urban constraints.

NEW SCIENTIFIC RESULTS

1. I have identified the **landscape architecture tools and school ground elements** that can be linked to the **topics of primary school subjects**, and the **subjects and leisure activities to which school ground element**s - related to functional design and plant application - **can be linked**. I have shown that the **possibilities offered by school grounds can be used to support teaching and learning activities** in most subjects, and that **even the smallest school grounds can be suitable** for this purpose.

2. I have developed a **method for the landscape study of school grounds with an environmental education focus**. The criteria include **baseline data on the educational institution, participation in environmental education programmes, urban structure** and **plot characteristics**, quantitative data on plot and **green space**, plant application characteristics, qualitative and quantitative characteristics

of **school grounds functions**, and **technical condition** and maintenance issues.

3. I have found that **in many aspects**, domestic **school grounds do not meet the standards** of the Hungarian Standards Board's standard MSZE 24203-2:2012. The **degree of built-in areas** exceeds the requirements of the standard in a significant number of schools, and in the case of schools located in the inner zone, it exceeds the requirements of the standard by a significant margin. The **per capita plot size**, calculated on the basis of the maximum number of pupils, is acceptable only for a small number of institutions.

4. **I classified school grounds according to their environmental educational potential.** The typology was based on the results of field surveys carried out according to a criteria framework developed on the basis of literature research. As a result of the typology, I identified school grounds with **low, medium and high environmental education potential**. School grounds with **low** environmental education potential are located in the **inner zone**, in a **closed built-up environment**, typically are grounds of **schools built before 1945**, with small **plots of less than 3000 m^2** and **minimal green space**. In contrast, school gardens with a **high** environmental education potential are located **outside the city centre**, in a **free-standing** or a **housing estate environment**, in institutions with an **Eco-School label**. These are mainly **schools built after 1945**, with a **size of over 10 000 m^2**, a **high green area ratio** and a **high canopy cover**. The school grounds with **medium** environmental education potential have **better** - albeit

not outstanding - **characteristics** than the low-potential institutions, but are **less or not used for environmental education purposes** compared to the high-potential school gardens.

5. I found that **functions related to education and environmental education**, and **microhabitats** are found i**n well-equipped school grounds with high resources**. Based on the results of the online questionnaire survey and the field visits, it can be concluded that the location of **sports facilities** is a **priority** in all schools. Consequently, school grounds with a high environmental education potential are not the only ones that can be considered as well-functioning in this respect: they are usually school grounds with a variety of sports fields and play facilities, located on large plots of land.

6. I have identified the **space requirements** for the **location of environmental education functions.** In addition to the predominant and space-intensive sports function, environmental education functions can generally be accommodated on **plots of larger than 10 000 m^2, with a maximum coverage of 25-30%**. These requirements can typically be met by schools built after the Second World War and located outside the city centre. Of the schools included in the database analysis, 55% were built in this period, i.e. **about half of the primary schools in Budapest have the theoretical possibility** to accommodate environmental education functions.

7. I have identified **the factors influencing the potential for environmental education:**

- **urban structure**: school gardens in open-air built-up areas typically have a high environmental education potential, while school gardens in closed built-up areas have a low potential.
- **plot sizes**: larger plot sizes imply higher environmental education potential.
- **green space ratio:** a higher green space ratio implies a higher environmental education potential
- **the institution's environmental education programme:** the Eco-School and Bird Friendly Garden labels indicate that the institution's school ground is likely to have a high environmental education potential.

8. I have identified the **three main user groups of primary school grounds**. These are **girls aged 7-10**, **girls aged 11-14** and **boys aged 7-14**. The groups are clearly distinguished in terms of both favourite activities and favourite places. Younger girls (and to some extent also boys in Year 2) prefer **play activities**, in free or structured play areas. In the case of older girls, there is a clear preference for **social activities**, in associated recreational areas, or possibly in other green areas of the school where there is an opportunity for retreat and walking. For boys, **sport activities** and sports fields are the most popular, but similarly to girls, there is also a preference for games among younger boys and social activities among older boys.

9. I found that **among older pupils aged 11-14**, the favourite activities are much **less determined by the specific characteristics of school grounds**, but rather by a **general pattern determined by age and gender**, which can be matched to the **developmental and**

psychological characteristics of children. In contrast, among younger children, the characteristics of the school grounds have a greater influence on the activities that take place there.

10. I confirmed the **importance of spaces for free play**. In institutions where extensive green spaces provide opportunities for free play, these spaces are popular not only among younger girls aged 7-10 (who prefer play areas anyway), but also among boys and older girls. It can also be observed that, **regardless of the size of the space available**, almost **all institutions have places that children use for unstructured play**. It can also be observed that in the institutions with the most green space for free play, the preference for free play areas is much higher than average.

CONCLUSIONS AND PROPOSALS

The **multifunctional nature of the school ground** as an open space is not only evident in the many functions of the school grounds (sports, play, recreation, learning), but also in the educational function. The analysis of the Framework Curriculum has shown that **environmental education is linked** in some way **to the curriculum of almost all primary school subjects**, and that the **school ground can be used as a teaching site, an object of instruction, a visual aid** or a combination of these in the curriculum and in the educational programme of the institutions. In many cases, **the very existence of a school ground offers many opportunities**, even if it is not possible to create multilevel vegetation and space-consuming microhabitats. However, **the more complex the design** of the school ground, **the more diverse the functions** it can fulfil, the more values and knowledge it can transmit.

Based on a data analysis of primary schools in Budapest, I found that **environmental education is becoming more prominent in a growing number of schools, which is also increasing the attention paid to school grounds.** This change could not be tracked by the Public Education Information System, which registers educational institutions and does not contain information either on plot size or on the proportion of built-up and green areas. Accordingly, no information on compliance with the plot size required by MSZE 24203-2:2012 can be found, and it is therefore **recommended that basic information on school grounds be included in the register of primary schools.**

During the on-site visits, it was found that, in general, **functions related to environmental education are found in well-endowed school gardens**. **Plots**

larger than 10 000 m^2, with a maximum built-up area of 25-30%, are those where environmental education functions can be fully accommodated and are accessible to pupils. **Plots of less than 3 000 m^2 and more than 60% built-up area have limited possibilities** for small-scale, object-like and vertical elements. In these cases, it is advisable to establish **close links with green spaces and other areas outside the school** so that they can be integrated into the life of the school, thus ensuring that pupils do not miss out on any functions.

The need to create more nature-based school grounds linked to environmental education and free play is also shown by the park use surveys. The school grounds surveyed are very diverse, yet children find **places to play freely regardless of the size and quality of space** available. In all cases, where there was an opportunity, this was **linked to some kind of green space**. The analysis of favourite activities and locations also showed that children's choices are not only and not primarily **influenced** by the physical layout of the schoolyard, but rather **by age and gender differences and their developmental and psychological characteristics**. In addition to the above**, teachers also have a very important role to play** in determining which activities pupils prefer and which places they develop a long-term attachment to.

Based on the experience of the research findings, I have prepared a **proposal for a functional design applicable to the three types of school grounds with different environmental educational potential**. It is essential that the school gardens include green areas for free play as part of the play space, which children can use for play according to their age and creativity. In addition, school gardens with a high environmental education potential can also be used to create natural areas closely linked to environmental education.

PUBLICATIONS RELATED TO THE SUBJECT OF THE THESIS

Journal articles

Boromisza, Zs., Kollányi, L., Jákli, E., Földi, Zs. (2020): Education with the landscape – challenges in science communication and ecotourism. *4D: Tájépítészeti és Kertművészeti Folyóirat,* 55, 2-11. p. ISSN: 1787-6613

Jákli, E. (2020): Iskolás gyermekek szabadtér-használati preferenciái az iskolakertekben. *Journal of Applied Technical and Educational Sciences,* 10(1), 63-81. p. ISSN: 2560-5429

Jákli E. (2018): Environmental educational potentials on school grounds in Budapest. *Landscape & Environment,* 12 (1) 23-30. p. ISSN: 1789-7556

Conference proceedings and electronic publications

Boromisza Zs., Jákli E., Földi Zs. (2019): A tájépítészet tudománykommunikációs tapasztalatainak és kutatási lehetőségeinek vizsgálata. In: Fazekas I., Lázár I. (szerk.): Tájak működése és arculata. MTA DTB Földtudományi Szakbizottság, Debrecen. 249-252. p. ISBN: 978-963-7064-39-5

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Presentations on this topic

Jákli Eszter (2020): Children’s drawings in the design process. Minden térben gyerekekkel. Látok valamit, amit te nem! kultúrAktív webinárium.

Jákli Eszter (2019): Gyermekbarát óvoda- és iskolakertek. Egészséges építészet, gyerekbarát építés, konferencia. Kecskemét.