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Integrating the free exploration of nature into environmental education

Theses for doctoral (PhD) dissertation

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1. Introduction and justification of the topic

According to Lehoczky (1999), environmental education cannot be imagined without learning about the real environment and without the experience of personal encounters. Environmental educators therefore have the task of educating in the field, or in other words, of organising an outdoor school. Outdoor environmental education is generally understood as intensive education, i.e. a conscious and deliberate educational activity carried out by an educator on a pupil. However, outdoor environmental education may also include functional education, i.e. education in an unintended form. In the classical sense, this includes influences such as social interactions, media, language, politics or religion (Kron, 1997). However, functional educational influences caused by the natural environment can also be considered as part of outdoor environmental education. The mere experience of nature itself, without any specific educational activity (e.g. camping, walking in the woods, playing in the meadows), can also have an impact on our personality. On this basis, the dissertation research defines outdoor environmental education as any programme coordinated and/or supervised by teachers and educators that involves contact with nature. However, it is also important to note that in some school programmes, teachers may consciously (intensively) use programmes whose main aim is to allow students to experience nature freely, free of other tasks. The dissertation research covered this extended interpretative framework of outdoor environmental education, focusing on the pedagogical impact and use of free exploration of nature.

Free exploration of nature in a school setting can be understood as the freedom of the students to spend their time in nature (e.g. free movement and play), with the teacher's role being to supervise. The teacher is thus relegated to a passive role, while the children are free to spend their time in nature. In the traditional sense, the free exploration of nature is not considered part of the pedagogical process. The fundamental aim of this dissertation is to draw attention to the pedagogical value of the programme and the importance of integrating it into the pedagogical process. From a learning theory point of view, free exploration of nature can be placed within the framework of several pedagogical paradigms, but it is not a complete part of any of them, as it is not primarily a teaching method. The dissertation research did not choose a framing paradigm either, because the main aim was not to investigate learning through free exploration of nature. Learning can take place through free exploration of nature, but the other effects of the programme are at least as important. For example, students may strengthen their emotional attachment to nature while gaining positive experiences and becoming healthier, more focused and less stressed (see e.g. Bezeljak et al, 2023; Corraliza and Collado, 2011). Can we call these

effects learning? Hardly directly, but they can have an impact in a number of areas, including the development of environmentally conscious behaviour. Paradoxically, the integration of free exploration of nature in schools should not only be addressed from a learning perspective, but also because unstructured experiences of nature are less and less part of our everyday lives, with all their positive aspects (see e.g. Hofferth, 2009). The lack of leisure time in nature is a problem, as often the opposite of these positive aspects prevail, such as the distancing from nature and increasing stress (see e.g. Louv, 2008). The lack of free exploration of nature must be addressed through education systems, which is a new challenge. At the same time, the teaching processes themselves face new challenges, for example, in developing environmentally conscious behaviour among young people, some of whom have barely experienced what it is like just to be 'present' in nature. In addition, a lack of free time and excessive constraints are present in many learning processes (see e.g. Pierce and Beames, 2024; Ohlsson et al., 2024), which may also justify but also complicate the integration of the programme. Another difficulty is that, in contrast to typical pedagogical practices, the free exploration of nature requires the passive supervisory role of the teacher. However, this is only true for the programme itself, not for the work that precedes and follows it, as children need to be taught to spend time in nature without a specific purpose or structured activity, which can be a lot of work, and the processing and curriculum integration of the experiences they have had is also a lot of work for the teacher.

2. The aim of the research and the research questions

The aim of the dissertation research was to investigate free exploration of nature in terms of its pedagogical potential, its emergence in education and the need, possibility and way of its integration into education.

I have formulated the following eight research questions:

- Research question 1: How often do students negatively rate outdoor environmental education activities and associate them with too many compulsory programmes, too much discipline and lack of free time?
- Research question 2: In the case of students, what is the relationship between the negative perception of outdoor environmental education programs, the excessive number of mandatory programs, too much discipline, and lack of free time experienced during these programs, and the strength of nature connectedness?

- Research question 3: How important is the free exploration of nature from an (environmental) pedagogical point of view and what positive effects can it have?
- Research question 4: What are the possible negatives of free exploration of nature and how prevalent are they?
- Research question 5: In the Hungarian school system in general, how much and in what form does free exploration of nature take place?
- Research question 6: Is there a need for more integration of free exploration of nature in education and, if so, how can this be promoted?
- Research question 7: How can free exploration of nature be effectively implemented in education?
- Research question 8: How do some aspects of the free exploration of nature differ between different types of schools?

3. Research methods and sample

I used the mixed methods paradigm to investigate the research questions. This involves the use of quantitative and qualitative data collection and analysis techniques in parallel or sequentially (Sántha, 2015). In examining the research questions, I followed the principles of systematic perspective triangulation, which means the triangulation of theories, methods, data and investigators (Flick, 2005; cited in Sántha, 2015, p. 28). Systematic perspective triangulation was achieved in the research. The dissertation research was divided into quantitative and qualitative parts, which division was determined by the type of data collected. Quantitative data were collected through questionnaires for headteachers, teachers and students. The questionnaire for headteachers were deliberately separated from the questionnaires for teachers (although in general headteachers are also teachers), thus asking separately those responsible for the management of the schools and those not responsible. The questionnaires for headteachers could also be completed by deputy headteachers (who were also treated as headteachers in the research). There were three types of teacher questionnaires. I prepared separate questionnaires for subject teachers (teachers of science, geography, biology, physics, chemistry, physical education), class teachers and teachers who organise school programmes. The questionnaires for headteachers were primarily designed to explore the general functioning of schools and certain attitudes of headteachers and teachers in relation to this topic. Teacher

questionnaires were used to investigate the implementation of free exploration of nature in subjects, class trips and school programmes, complemented by an analysis of teachers' attitudes. In the questionnaires for headteachers and teachers, the possible locations for the implementation of free exploration of nature were identified according to the following categories:

a) Built environment with natural elements: for example, a playground, sports field or park where built elements dominate but green elements are also present (trees, lawn, etc.)

b) Natural environment with built elements: the natural environment is dominant, but there are also built elements, such as a forest playground, a forest running track, a ski slope

c) Purely natural environment: not characterised by built elements

The student questionnaires were designed to investigate the nature connectedness and nature experiences of students in grades 5–8 in and out of school, focusing on the characteristics of the programmes and their feelings about the programmes. In order to investigate nature connectedness, I incorporated into the student questionnaires the Inclusion of Nature in Self Scale (Schultz, 2002) and a children's adaptation of the 6-item Nature Relatedness Scale (original scale: Nisbet and Zelenski, 2013; adaptation: Halbritter, 2021). The focus of the qualitative research was on the forms of free exploration of nature in schools, its impact and its integration into pedagogical processes. The qualitative data collection included interviews with headteachers, teachers and observations. For the interviews, a separate set of questions was asked to the heads of the schools and to the teachers (the latter not having a managerial position). The observations concerned the behaviour of the students and supervising teachers participating in the outdoor informal programmes and the environment surrounding them. In some cases, the questionnaires also included open-ended questions, thus allowing for qualitative data analysis.

A total of 37 educational institutions, including primary and secondary schools, participated in the quantitative (questionnaire) survey. Some of these schools were art, sports, language-centric, minority, religious or training schools. The criterion for inclusion in the sample was that the school should have grades 5–8, as the student questionnaires were targeted at this age group. Educational institutions from all over Hungary could apply to participate in the survey. The selection of schools was based on a disproportionate stratified random sampling (i.e. the number of schools in each subgroup was not representative of the national proportions). 18 of the schools were certified as eco-schools and 19 were not. The sample included 13–13

municipal schools and rural urban schools and 11 schools in Budapest. The sample of the quantitative research consisted of 35 headteachers, 78 subject teachers, 30 class teachers, 25 programme organiser teacher and 419 students. The sample for the qualitative research was selected from schools with extreme values on the basis of the questionnaire surveys, as they may have a stronger perspective on the issues. The extreme values were related to the strength of students' connectedness to nature, the attitude of headteachers and teachers to the programme, as well as the frequency of free exploration of nature in lessons, class trips, camps and events. Five educational institutions participated in the qualitative research, in which a semi-structured interview was conducted with the head teachers (and/or deputy head teachers) and 2–3 other teachers teaching in the school. For the latter, I selected teachers who were involved in some way in the implementation of programmes in natural environments (e.g. programme organisers or teachers of environmental subjects). 6 headteachers and 11 teachers participated as respondents in the interview research. In addition, observations were carried out in the schools. These took place in the schoolyards, where I recorded the characteristics of students' free activities during breaks and daycares.

In the quantitative research, data were processed using descriptive and inferential statistics. The comparative statistical methods used were the chi-square test, two-sample t-test, Mann-Whitney U test, one-way ANOVA test, Kruskall-Wallis test, and hierarchical linear and probit regression analysis. These were performed using the following statistical programs.

Data processing was based on the content analysis methodology of Grounded Theory (Glaser and Strauss, 1967) for interviews and observations. This involves breaking down empirical data into different codes during the coding process and then classifying them into abstract categories for analysis. This is done in a three-step process involving open, axial and selective coding. The data collected through interviews and observations were analysed using MAXQDA Analytics Pro. For these analyses, the reliability of the results was increased by intracoding, i.e. the text corpus was coded twice and then the results of the two coding processes were compared. The reliability of the intracoding was calculated using Cohen's kappa, which is used to express the degree of agreement between the categories of the two encodings. For the questionnaires, I processed the answers to some open-ended questions by single-coding them according to the interview categories, using excel spreadsheets and my own colour codes.

4. Results of the research

Research question 1: How often do students negatively rate outdoor environmental education activities and associate them with too many compulsory programmes, too much discipline and lack of free time?

One of the key findings of the research is that 54,9% of students associated their nature-related school experience with too many compulsory programmes, too much discipline and/or lack of free time. Although previous research has supported that outdoor environmental education can have negative effects, the strong presence of these three characteristics has not been mentioned in the literature on the subject (I will refer to these characteristics as negative feelings in the following, as they were perceived by students). The results suggest that the presence of too many compulsory programmes, too much discipline or lack of free time does not lead to negative perceptions of programmes in general in the majority of cases. However, it is very likely to lead to a general ambivalent perception, as ambivalent school experiences were most often associated with at least one of the three negative feelings.

Research question 2: In the case of students, what is the relationship between the negative perception of outdoor environmental education programs, the excessive number of mandatory programs, too much discipline, and lack of free time experienced during these programs, and the strength of nature connectedness?

The ANOVA analysis revealed that students who were generally ambivalent about their current school experience[1] had significantly weaker nature connectedness than those who were positive. Regression analyses showed that the three negatives mentioned in the research did not have a negative association in themselves with the strength of nature connectedness, only through their presence in the ambivalent (of current-school experiences) and negative (of out-of-current-school experiences) overall assessment, thus in the associations of these general assessments with nature connectedness in terms of Nature Relatedness Scale (hereafter: NR-6), other negative perceptions than the three negatives also had a role.

Whereas in the case of the latest school experiences, the ambivalent quality of the overall assessment does, in the case of out-of-current-school experiences – which are often previous-school experiences –, the purely negative quality of them seems to be important in the lower extent of nature connectedness in the term of NR-6. One possible reason for this is that purely

[1] The term „experience" in the student questionnaire results always refers to an experience related to nature.

negative experiences are more deeply embedded and resilient, whereas ambivalent experiences are less powerful and have less impact in the long term (as inferred from Baumeister et al., 2001). Negative experiences therefore have a stronger impact even when they are linked to older events. It should be noted, however, that scores on the Inclusion of Nature in Self Scale (INS) did not show a correlation with overall negative ratings of out-of-current experiences.

Research question 3: How important is the free exploration of nature from an (environmental) pedagogical point of view and what positive effects can it have?

According to the questionnaires, 91,2% of headteachers, 84,6% of subject teachers, 83,4% of class teachers and 96% of program organiser teachers thought that the free exploration of nature can have a significant positive impact or is an indispensable pedagogical element. This underlines the pedagogical importance of the programme.

The interview research also explored in detail the positive aspects that teachers (including headteachers) associate with the free exploration of nature. A lot of information was mentioned about the positive aspects of the programme, this category being the third most mentioned (303). These responses were grouped into subcategories for qualitative processing. On this basis, the following types of positives can be distinguished: learning effects; health and physical effects; feelings and experiences; environmental effects; social and communication effects; psychological effects (e.g. personality, attitude); other positives. Responses to some of the open-ended questions in the questionnaire research were also categorised into categories that were separated during the qualitative interview research. In doing so, I have also separated an additional category within other positives, which includes information that experiences, observations and discoveries in nature are positive in themselves. The questionnaire responses on the positives of the programme also show that the headteachers, subject teachers, class teachers and programme organiser teachers most frequently mentioned learning and other positives as categories.

Regression analysis of the student questionnaires showed that the sense of discovery associated with current-school experience was positively related to the strength of nature connectedness. In addition, the sense of discovery itself was related to nature connectedness and this was not eliminated by the presence of a general positive evaluation. This finding is further supported by the fact that the relationship of the sense of discovery with nature connectedness was demonstrated by both NR-6 and INS scores.

According to the results of the student questionnaire, the activity most often associated with students' experiences was free exploration. However, the analyses did not show a relationship between the presence of free exploration of nature and the strength of the nature connectedness. However, the significant relationship shown for the sense of discovery and the non-significant relationship for the sense of freedom suggest that free exploration is not related to the strength of the nature connectedness in terms of activity type, but rather in terms of its perception. The important thing is not whether the programme was unstructured in nature, but whether the children experienced a sense of discovery within the nature-based programme.

Research question 4: What are the possible negatives of free exploration of nature and how prevalent are they?

Of all the questionnaires completed, only one teacher questionnaire (1.3% of teacher questionnaires) indicated that the programme had more negatives than positives. Interviews also showed a significant majority of positives, with only 64 codes for negatives compared to 303 for positives. The categories of negatives, based on the interviews and questionnaires, were: students' feelings (including feelings of boredom or fear, trauma, discomfort); students' behaviour; conflicts between students; teachers' feelings; parents' feelings; environmental damage; risk of accidents; questioning the usefulness of the programme; lack of negatives or majority of positives; other negatives. Overall, after „other" negatives, the most frequent category was the risk of accidents. Class teachers and programme organizer teachers mentioned this category particularly often (37,5% and 33,3% respectively). It can be assumed that they experienced this downside of the programme more often. There was also a significant number of mentions of the category of the absence of negatives, with the highest number of mentions for headteachers.

Research question 5: In the Hungarian school system in general, how much and in what form does free exploration of nature take place?

According to the responses of the headteachers, 61,8% of the curricula of the institutions examined include the free exploration of nature as a programme element to be implemented. 41,8% of school curricula also include a specific provision on the duration and/or frequency of the programme. 29,4% of institutions have a curriculum that extends this type of programme to all grades.

If we look at the actual implementation, the free exploration of nature is most common in science, environmental studies, geography, biology, physical education, and class teacher

lessons, but it can also occur in other subjects. Based on the questionnaires and interviews it can also be identified a number of extra-curricular opportunities where the programme could be implemented, such as daycares, breaks, excursions (including cycling and rowing programmes), class trips, camps, forest schools, special days, theme days and weeks (or project days and weeks), workshops, environmental actions, field trips, study trips, field trips. Class trips are often an opportunity to explore nature freely. All headteachers have indicated that this programme tends to be implemented during their school's class trips. In 94% of the schools examined by the headteachers' questionnaires, the programme takes place in a purely natural environment, 74% in a built environment with natural elements and 65% in a natural environment with built elements.

Through the subject teacher questionnaires, the characteristics of science, geography, biology, chemistry, physics and physical education lessons were investigated. Both in built environments with natural elements, natural environments with built elements and purely natural environments, these lessons were implemented on average less than five times per year. Nevertheless, it can be said that these lessons were significantly more frequent in built environments with natural elements than in natural environments with built elements and in pure natural environments. The proportion of free exploration was on average less than 10% for lessons in built environments with natural elements and natural environments with built elements, while it was in the 10–25% range for lessons in purely natural environments. The proportion of lessons in different types of environments, and the proportion of free exploration within them, also varied between subjects. Physical education was the most varied from the average, with an average of 21–30 lessons per year in built environments with natural elements. On average, 26–50% of class trips programmes took place in each of the three locations, with 26–50% of the programmes being free exploration. For camps and events in a green environment (the same 3 categories of sites), the average time spent in a green environment is 76–90% of the total duration and on average 26–50% of this time is spent in free exploration.

Observation has also helped to analyse more comprehensively how free exploration of nature is implemented in schools and to identify relevant categories. The categories identified during the observation of the programme were: natural environmental elements of the site; artificial environmental elements of the site; children's activities; teacher control; group dynamics; natural play elements; artificial play elements; and site utilisation.

Research question 6: Is there a need for more integration of free exploration of nature in education and, if so, how can this be promoted?

79,4% of headteachers think that the proportion of free exploration of nature should be increased in their institution. Of these respondents, 5,9% call for a large increase in the presence of the programme. According to the questionnaires for headteachers and subject teachers, the main obstacles to the implementation of the programme are the curriculum, the specificities of the educational system and lack of time. These factors were highlighted by 41,2% of headteachers and 53,7% of subject teachers. These barriers are closely interlinked. A large proportion of the barriers to the curriculum and education system are related to constraints, too much curriculum and requirements, and a lack of teaching hours that can be spent on the programme. Based on the interviews and questionnaires, it is also important to mention other possible barriers, such as students' attitudes and negative feelings, risk of accidents, environment, weather, parental attitudes and behaviour. In addition, I also used the interviews to categorise the steps that teachers consider important to take to disseminate the programme. The related categories were: change in teachers' attitudes; patronage; exchange of experience; changing the structure of education, its professional content and the attitudes of decision-makers; other options. The related questionnaire responses of headteachers were classified in the same categories, with changes in the structure of education, professional content and the attitude of decision-makers mentioned most often, at 54%. It should also be highlighted that improving the curricula, infrastructure and methods of teacher training can play a key role in changing teachers' attitudes.

Research question 7: How can free exploration of nature be effectively implemented in education?

The interview research also categorised the aspects that are important to keep in mind and consider during implementation. The following categories were identified: the age of the pupils; the preparation; the organisation and control of the programme and, within this, the organisation and control used for teaching and education purposes; the link between the programme and the educational and organisational system of the schools; other aspects. Negative aspects relating to the risk of accidents and to pupils' feelings and behaviour should be given particular attention in the implementation and design of the programme. As part of this, practising teachers should develop ideal training and preparation processes. For example, it is important to develop effective accident and health plans, and to prepare students for the dangers (e.g. of creatures

that cause allergies or stings) and realities of the living world (e.g. scary creatures). Accident prevention, student fears and other negatives should be addressed throughout the programme.

Based on the results of the subject teacher questionnaires, it is also worth stressing that lessons should be held more often in places where the proportion of natural elements exceeds the proportion of built elements, as currently less natural outdoor places are used more often. The student questionnaires also reveal another important aspect of implementation. 97% of the out-of-school experiences were shared with peers (e.g. family, friends), which suggests that the most memorable experiences for students will be those in nature that they share with others. Thus, if we are to provide students with powerful and lasting experiences in the context of outdoor environmental education, we must focus not only on the relationship with nature, but also on the relationship with peers in nature.

Research question 8: How do some aspects of the free exploration of nature differ between different types of schools?

The curricula of eco-schools contained a higher proportion of free exploration of nature as a programme element, and there were also differences between the two types of schools in terms of actual implementation. In the case of eco-schools, free exploration was more common in extra-curricular activities, and in lessons (science, geography, biology, chemistry, physics, physical education) in a purely natural environment, the overall proportion of free exploration was higher. In addition, subject teachers were more positive about the pedagogical relevance of the programme in eco-schools, and students more often associated the feeling of informality with nature experiences that are related to their school. At the same time, however, in institutions without the eco-school title, more time was actually spent in green environments during camps and events held in a partially or entirely green environment. The results suggest that eco-schools are more likely to have a higher incidence of free exploration of nature in and out of lessons. This confirms the importance of the eco-school movement. Based on the case model set up as part of the interview research, it can be concluded that differences in teachers' attitudes towards the topic may have been influenced by the school environment, The results of the observation also suggest that the characteristic and frequency of the programme implementation may be influenced by the primary/secondary school status of the institution.

5. Outline of the results in thesis form

Thesis 1: 54,9% of students associated their school experience of nature with too many compulsory programmes, too much discipline and/or lack of free time.
Recommendation: it would be important to reduce the presence of these three negatives in outdoor environmental education.

Thesis 2: Students who were generally ambivalent about their school experience of nature have significantly weaker nature connectedness than those who are positive.
Recommendation: research topics should be extended to the ambivalent perception of outdoor environmental education programmes. Solutions that can help to reduce ambivalent perceptions should be developed. Reducing the proportion of organised programmes, increasing free time and rethinking discipline methods may be necessary, but other factors also need to be changed. Future research should also focus on identifying these factors.

Thesis 3: A sense of discovery during nature-related school experiences was positively associated to the strength of nature connectedness.
Recommendation: the causality of the relationship must be explored to get an accurate picture of the role of the sense of discovery. If the results justify, there should be a conscious emphasis on nature-based programmes that can give students a sense of discovery.

Thesis 4: 91,2% of headmasters, 84,6% of subject teachers, 83,4% of class teachers and 96% of program organizer teachers believed that the free exploration of nature can have a significant positive impact or is an indispensable pedagogical element. The most frequently mentioned positive aspect was the learning impact.
Note: this confirms the pedagogical relevance of the programme.

Thesis 5: 79,4% of headmasters think that the proportion of free exploration of nature should be increased in their institution.
Note: this justifies the need for pedagogical integration of the programme.

Thesis 6: the risk of accidents is the main negative of the free exploration of nature.
Recommendation: The negative aspects related to the risk of accidents need to be taken into account in the implementation and design of the programme. As part of this, practising teachers are responsible for developing the ideal training and preparation processes. For example, it is important to develop effective accident and health plans and to prepare students for hazards.

Thesis 7: Science, geography, biology, chemistry, physics and physical education lessons were significantly more often implemented in built environments with natural elements than in natural environments with built elements and in purely natural environments.
Recommendation: it would be important to emphasise that these lessons should take place more often in places where the proportion of natural elements outweighs the proportion of built elements.

Thesis 8: According to 41,2% of headmasters and 53,4% of subject teachers, the main obstacles to the implementation of the programme are the curriculum, the specificities of the education system and/or lack of time.
Recommendation: reducing these barriers should be a priority

Thesis 9: 54% of the headmasters highlighted the need to change the structure of education, the professional content of education and/or the attitude of decision-makers in order to spread the programme.
Recommendation: these areas are important priorities to bring the programme to the fore.

Thesis 10: Eco-schools are more likely than non-ecoschools to implement free exploration of nature in and out of lessons.
Note: this confirms the importance of the eco-school movement.

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