UNIVERSITY OF SOPRON

Faculty of Forestry

Theses of Doctorial (PhD) dissertation

THE ROLE OF MUSEUMS IN THE DEVELOPMENT OF ENVIRONMENTALLY CONSCIOUS BEHAVIOUR: EDUCATION FOR SUSTAINABILITY FROM THE CONSERVATION OF INANIMATE VALUES TO FOREST PEDAGOGY

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1. Topicality of the subject

The scope of raising awareness cannot be limited to educational institutions, it should permeate the everyday lives of children. This is particularly important nowadays, when people's lifestyles are becoming increasingly distant and alienated from nature. Environmental education is essential to make future generations recognise that man is inseparable from nature.

Environmental education programmes have become increasingly widespread in museums, and these museum-based educational activities offer an increasing range of learning and experience opportunities for people of all age groups. Sustainability training includes the representation of inanimate natural assets and the preservation of our geological heritage, thus museums can play a prominent role in this process. The objective of this thesis is to find common ground between environmental awareness training and museum education.

In our PhD research, we investigated the role of thematic museums in environmental education. We evaluated the difference in knowledge of students participating in museum education activities in the short and long term.

This thesis presents a representative study of issues that have not been addressed before.

2. Research Objectives

- Presentation of the role of museum pedagogy in environmental education.
- Analysis of the performances of 3 Hungarian thematic natural history museums in environmental education.
- Development of environmental awareness skills of third, fourth, fifth and sixth grade students participating in museum activities with the most comprehensive scientific basis possible and enhancement of their knowledge of our living and non-living natural resources.

- Observation of the impact of environmental education in museum sessions among students from third to sixth grade, documentation of the changes in their level of knowledge and measurement of short and long-term retention (effectiveness evaluation).
- Observation of progress in the level of knowledge, both individually and by age group (primary and secondary), considering the age characteristics of the target groups.
- Investigation of the attitudes of primary school students in relation to museum and field activities associated with a selected geological section.

3. Research Hypotheses

H1: Forest pedagogy methods can be integrated into museum pedagogy sessions.

H2: By complementing museum pedagogy methods with forest pedagogy techniques, the effectiveness of environmental education of students can be increased the amount of student knowledge of environmental in museums.

H3: The environmental knowledge of students in the we have selected research area is likely to be deficient on the studied issues.

H4: We expect a significant difference between the two measurements. After the sessions, students' performance will be considerably improved according to the tests they complete.

H5: In a longitudinal study, we hypothesise that in case of a repeated interview after one year, the level of knowledge will decrease compared to the values measured immediately after the programme.

H6: A better result can be achieved in altering the knowledge level of students during museum education sessions if they gain insight into both our inanimate and living world.

H7: Complementing museum education sessions with the methods and tools of forest pedagogy can significantly contribute to a positive change in the students' environmental attitudes.

H8: Students who have participated in both the museum session and the field session will have a greater degree of attitude change in a more positive direction compared to those who have only encountered our inanimate assets in the field session.

H9: Children who participated in museum and field activities have more positive environmental attitudes than students who did not participate at all.

4. Research Methods

- Analysis of international and domestic literature;
- Analysis of museum education sessions through questionnaire survey;
- Analysis of museum and field sessions through reflective map;
- Analysis of attitude change on Likert scale;

4.1. Analysis of international and domestic literature

The research subject is rather specific, therefore several domestic and international literature sources were analysed to get a comprehensive picture of the research areas. Most of the literature on this field of research comes from France and Germany.

4.2. Analysis of museum education sessions through questionnaire survey

As a part of the research, museum pedagogy sessions were held for primary school students from September to October 2021 in the Museum of Pásztó, the Agricultural Museum of Hungary and the Zsigmond Széchenyi Hungarian Hunting Museum of the Carpathian Basin. According to the schedule, 12 classes with 296 students participated in the longitudinal study, which was intended to last 1 year. Empirical measurement instruments (questionnaires/tests) were compiled for each session to assess students' opinions and changes in their level of knowledge. The only difference between the pre- and post-measurement tests was their sequential order, to ensure equivalence. One year after the study, the surveys were repeated.
A total of 2058 tests were completed, of which 1977 could be used for individual level assessment.

4.3. Attitude change analysis

Attitude change was assessed using two methods. One method was to create and analyse concept maps. Another method, a Likert scale, was also used to confirm the change in attitudes, as this objective scale provides a quantifiable measure regarding the attitudes.
In May 2023, we held a session on the Middle Miocene Sarmatian period for a fourth and a sixth grade class at the permanent exhibition “Message of the Millions of Years in Nógrád” of the Museum of Pásztó, and then we took them to the geological section of Kozárd, where they could observe the previously discussed facts about the fauna hidden in the Sarmatian limestones during a field session. We also took a fourth- and a sixth-grade class to the type area of the Kozárd section, who had not previously been on a guided tour of the museum to learn about it.
Both before and after the sessions, the students of the four classes were asked to list all the possible terms they could think of regarding the theme of the inanimate natural asset. 73 concept maps were returned to us for analysis (n total =73). We were interested in the extent to which the amount of concept and natural resource knowledge and the structuring of

the concept maps changed at individual level over the two studies. During our study, we assessed both the most common concepts on concept maps and the extent to which they changed as a result of the session. We also considered the extent to which the structuring of concept maps and the quantity of concepts changed over the two studies.
In order to construct the Likert scales, we studied official international attitude scales and previous domestic and international research using these standard scales. However, due to the specific nature of the study, some of the standard statements were adapted to the field/museum topic. The students participating in the study were presented with 22 statements related to their habits, attitudes, intentions, feelings and thinking about the environment. They were asked to indicate their agreement or disagreement on a Likert scale of 1 to +5 (1: strongly disagree; 5: completely agree). Six months after the sessions (by which time the students had reached the 5th and 7th grades), we measured the students' attitudes towards their environment.
This self-reporting survey instrument was also completed with a similar number of control group to compare results (n total=138 students). The control group consisted of 5th and 7th grade students who had neither attended the museum lecture nor the session at the geology section.

5. Research outcomes, conclusions and theses

On the basis of our research, we can conclude that museum-based environmental education activities provide an effective means of practical implementation of sustainability pedagogy, therefore they represent a niche role in public education. Forest pedagogical methods were present in each of the three museum sessions.
In the complex system of environmental education, sustainability education, museum pedagogy and forest pedagogy, we need to find the interconnections. Through action-oriented methods, conscious planning, experience-oriented programmes and authentic models, we can lay the foundations for an environmentally aware approach and contribute to the development of attitudes that are aware of and sensitive to sustainability.

A significant achievement is that our research has demonstrated that museum-based activities can enhance the effectiveness of field-based environmental education activities.
The expansion of students' knowledge is the first step in the process of environmental education/sustainability education towards an environmentally conscious lifestyle, as a necessary and indispensable condition in the process of environmental education is the expansion of environmental/natural knowledge, which later induces a change in attitudes and, in the long run, environmentally conscious behaviour.

5.1. Theses

T1: Forest education methods were applied in all three sessions which could be very well integrated into the museum education sessions.

T2: Statistically, we have shown that in all cases, the students' knowledge increased when taking the full test. This supports the idea that museums can increase the efficiency of environmental education for students.

T3: The percentage of correct answers to some of the questions in the tests that students completed before the sessions was often less than 50%. We can conclude that the students' environmental knowledge in the selected research area was severely lacking.

T4: Overall, not all of the tests produced better results immediately after the sessions, but on an individual level there were more correct answers in the second testing session. A significant difference was observed between the two measures, i.e. the students' performance improved after the session. This was also confirmed by the concept maps that followed the field sessions, as the quantitative and qualitative increase in concepts is a good indicator of the effectiveness of the sessions.

T5: Tests completed one year after the session yielded better results in all three museum education sessions than the incoming tests.

T6: Students who participated only in the field program expressed more concepts related to natural phenomena and their own emotions in test II, whereas students who participated in both the museum and field program tended to have more concepts related to knowledge of natural sciences.

T7: The attitude analysis provided more difficult, but statistically detectable and quantifiable results, where the change was almost invariably positive, but could not always be considered significant. We can conclude that museum education, complemented by forest pedagogy methods and tools, can contribute significantly to a positive change in the students' environmental attitudes.

T8: In the case of students who have participated in both museum and field activities, there is statistical evidence of the impact of these sessions in positively affecting attitudes in the long term.

T9: There was no clear evidence that children who participated in museum and field sessions had more positive environmental attitudes.

6. Publications on the subject of the thesis

1. CSÁKINÉ DOBOS, LAURA (2020): A környezeti nevelés gyakorlata egy természettudományi tematikus múzeumban, a Pásztói Múzeumban. In: LETT, BÉLA; GÁL, JÁNOS; HORVÁTH, SÁNDOR; MOLNÁR, KATALIN; SCHIBERNA, ENDRE; STARK, MAGDOLNA (szerk.): *Tanulmánykötet Mészáros Károly tiszteletére 2020.* Sopron, Magyarország: Soproni Egyetem Kiadó. pp. 121-133.
   Műhelytanulmány része (Könyvrészlet)
2. CSÁKINÉ DOBOS, LAURA és KÖVENDI-SÁNDOR, ALEXA (2020): Fenntarthatóságra nevelés a Pásztói Múzeumban. In: BALOGH, ZOLTÁN (szerk.): *NEOGRAD 2020: A Dornyay Béla Múzeum Évkönyve XLIII.* Salgótarján, Magyarország: Dornyay Béla Múzeum. pp. 423-438.
   Szaktanulmány (Könyvrészlet)
3. CSÁKINÉ DOBOS, LAURA és KOLLARICS, TÍMEA (2022): A fenntarthatóságra nevelés az élettelen értékvédelemtől az erdőpedagógiáig – kutatás közben. In: CZIMBER, KORNÉL (szerk.): *Erdészeti Tudományos Konferencia, Kivonatok Kötete.* Sopron, Magyarország: Soproni Egyetem Erdőmérnöki Kar. 60 p. p. 25.
   Absztrakt/Kivonat (Egyéb konferenciaközlemény)
4. CSÁKINÉ DOBOS, LAURA (2022): Hatékonyságmérés múzeumok környezeti nevelésében: részeredmények a pásztói múzeumból. In: KÉRI, KATALIN; KISSNÉ ZSÁMBOKI, RÉKA; NÉMETH, DÓRA KATALIN; PÁSZTOR, ENIKŐ (szerk.): *Egy nyelvet beszélünk? Gyermeklét és pedagógia a nyelvi, kulturális és társadalmi terek kontextusában – 15. Képzés és Gyakorlat Nemzetközi Neveléstudományi Konferencia (2022. április 28.): Program és Absztraktok.* Sopron, Magyarország: Soproni Egyetem Kiadó 247. p. pp. 107-108.
   Absztrakt/Kivonat (Könyvrészlet)

5. CSÁKINÉ DOBOS, LAURA (2022): Fenntarthatóságra nevelés a múzeumokban. In: GRÉCZI, EMŐKE (szerk.): *MÚZEUMCAFÉ – A MÚZEUMOK MAGAZINJA 89.* 224. p. pp. 191 – 196.
   Szakcikk (Folyóiratcikk)
6. CSÁKINÉ DOBOS, LAURA és KOLLARICS, TÍMEA (2022): A fenntarthatóságra nevelés az élettelen értékvédelemtől az erdőpedagógiáig – kutatás közben. In: CZIMBER, KORNÉL (szerk.): *Erdészeti Tudományos Konferencia.* Sopron, Magyarország: Soproni Egyetem Kiadó. 316 p. pp. 152 - 156.
   Konferenciaközlemény (Könyvrészlet)
7. CSÁKINÉ DOBOS, L. (2022):
   Környezettudatosságra nevelés a múzeumokban. In: KISSNÉ ZSÁMBOKI, RÉKA (szerk.): *KÉPZÉS ÉS GYAKORLAT: TRAINING AND PRACTICE*, 20. évf. 2022/1−2. sz. pp. 50−58.
   Szakcikk (Folyóiratcikk)
8. CSÁKINÉ DOBOS, LAURA ÉS KOLLARICS, TÍMEA (2023): Investigation of a Museum Education Workshop of Széchenyi Zsigmond Hungarian Hunting Museum of Carpathian Basin, with a Focus on Education for Environmental Awareness. In: *Journal of applied technical and educational sciences.* 13 (2) 349. p., pp. 1 - 13.
   Szakcikk (Folyóiratcikk)
9. CSÁKINÉ DOBOS, LAURA és KOLLARICS, TÍMEA (2023): A Pásztói Múzeum szerepe a természettudományos ismeretek bővítésében és a környezettudatosságra nevelésben – egy longitudinális felmérés eredményei. In: JUHÁSZ, ERIAK és KATTEIN – PORNÓI, RIRA (szerk.): *Az oktatás határdimenziói: Absztraktkötet: Hungarian Conference on Educational Research HuCER 2023.*
   Szombathely, Magyarország: Magyar Nevelés – és Oktatáskutatók Egyesülete (HERA). 300 p. pp. 7 – 8.
   Absztrakt/Kivonat (Könyvrészlet)
10. CSÁKINÉ DOBOS, LAURA (2023): Lokális természeti értékeink ismeretével a globális problémák ellen – Környezeti nevelés a Pásztói Múzeumban. In: *„TUDOMÁNY: VÁLASZOK A GLOBÁLIS KIHÍVÁSOKRA”* – MAGYAR TUDOMÁNY

ÜNNEPE RENDEZVÉNY, Magyar Nemzeti Múzeum Forgács-Lipthay Kastélymúzeum, Szécsény, Magyarország.
Konferencia – előadás

11. CSÁKINÉ DOBOS, LAURA és KOLLARICS, TÍMEA (2024): Élő és élettelen természeti értékek iránti attitűd mérése egy múzeumi, illetve egy terepi foglalkozáshoz kapcsolódóan. In: CZIMBER, KORNÉL (szerk.): *Erdészeti Tudományos Konferencia, Kivonatok Kötete.* Sopron, Magyarország: Soproni Egyetem Erdőmérnöki Kar. 75 p. p. 59.
12. CSÁKINÉ DOBOS, LAURA ÉS KOLLARICS, TÍMEA (2024): A környezeti ismeretek és az attitűdök változásának vizsgálata a Pásztói Múzeum múzeumi és terepi foglalkozásaihoz kapcsolódóan. In.: JUHÁSZ, ERIKA és GYÁNYI, ISTVÁN (szerk.): *Az oktatás időszerű narratívumai. Absztraktkötet: Hungarian Conference on Educational Research HuCER 2024.*
Eger, Magyarország: Magyar Nevelés – és Oktatáskutatók Egyesülete (HERA). 467 p. pp. 59 – 60.
Absztrakt/Kivonat (Egyéb konferenciaközlemény)
13. CSÁKINÉ DOBOS, LAURA; HÍR, JÁNOS; KOLLARICS, TÍMEA; BERKI, IMRE; HOSCHEK, MÓNIKA (2025): Survey of Students'Attitudes Towards Natural Assets in Relation to Museum and Field Activities at the Kozárd Geological Section. In.: SZTANÓ, ORSOLYA (szerk.): Földtani Közlöny 155/1.
Szakcikk (Folyóiratcikk) Q3
14. HÍR, JÁNOS; CSÁKINÉ DOBOS, LAURA; KÖVENDI-SÁNDOR, ALEXA (2023): Nógrádi ősgerincesek. Sopron, Magyarország: Soproni Egyetem. 119.p.

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