

BASIC PRINCIPLES OF CREATING EDUCATIONAL TRAILS

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Abstract

Educational trails are structured recreational routes of varying length and difficulty that traverse natural, cultural, or regionally significant landscapes. These trails serve as platforms for disseminating knowledge about environmental conservation, cultural and historical heritage, regional geography, and human interaction with the landscape. As such, they represent an effective tool for environmental education and sustainable development. This work addresses the comprehensive process of planning, designing, routing, implementing, and maintaining educational trails. It further examines the legal and regulatory frameworks that govern their development, highlighting the essential legislative requirements necessary for their successful realization.

Key words: educational trail, environmental education, recreational infrastructure, sustainable development

Introduction

An educational trail is defined as an excursion-based tourist route marked within the landscape in various forms, with its length and thematic focus varying depending on local context. These trails are typically located in areas that feature natural, scenic, cultural, geological, or other forms of regional interest (BIZUBOVÁ ET AL., 2001).

At present, Slovakia lacks a formal regulatory framework governing the construction of educational trails, allowing any individual or legal entity to establish them. Furthermore, no official technical standards or manuals have been developed to guide their creation. Existing materials are limited to informal handbooks primarily aimed at civic associations, municipalities, professional organizations, and the broader expert and lay public.

Educational trails may be categorized according to various criteria, such as trail length, route configuration, level of difficulty, type of movement, thematic orientation, method of information presentation, and the specification of target user groups ([HTTP://NAUCNECHODNIKY.EU](http://NAUCNECHODNIKY.EU)).

Legislative Framework

The creation of an educational trail within the territory of the Slovak Republic is subject to compliance with a series of legislative requirements. Proper placement of a trail in the natural environment depends on a thorough understanding of the area concerned, especially regarding land ownership and rights. To establish an educational trail, consent must be obtained from the landowner, and all relevant provisions of generally binding legal regulations must be observed. If the landowner is not also the land manager, it is necessary to consult the proposed trail route and the placement of various elements with the land manager. This ensures the alignment of land management activities with the recreational use of the area.

If an educational trail is to be established within forest land, the process must adhere to Act No. 326/2005 Coll. on Forests. The trail initiator (i.e., the future trail administrator) is required to apply to the competent forestry administration authority for a decision granting an exemption from activities normally prohibited on forest land during the construction phase—such as the felling of trees and shrubs, disturbance of soil cover, and implementation of terrain modifications. The scope of the exemption depends on the nature and extent of the planned work.

In cases where the trail is to be located within a protected area (Levels II–V protection under Act No. 543/2002 Coll. on Nature and Landscape Protection, as amended), consent from the relevant nature and landscape protection authority is required.

Should the proposed location fall within areas governed by other specific, generally binding regulations, those legal provisions must also be respected during planning and project development. This includes, for example, Act No. 44/1988 Coll. on the Protection and Utilization of Mineral Resources (Mining Act), and Act No. 364/2004 Coll. on Waters (Water Act), as amended.

If the trail intersects areas designated as cultural monuments or monument zones, a statement from the Regional Monuments Office must be obtained in accordance with Act No. 49/2002 Coll. on the Protection of the Monument Fund, as amended.

In instances where the trail follows a completely new path outside of existing transportation access routes (e.g., agricultural or forest roads, footpaths, hiking trails), such use of the land requires a zoning decision—specifically, a land use decision issued by the competent territorial planning authority pursuant to Act No. 200/2022 Coll. on Spatial Planning—and a building permit issued by the relevant construction office under the new Building Act No. 25/2025. For educational trails that utilize existing roads and paths without the need for terrain modification, it is sufficient to notify the construction office regarding the placement of information panels and other recreational infrastructure considered as minor structures (e.g., gazebos, shelters, seating areas) in accordance with Building Act No. 25/2025.

Design and Implementation of an Educational Trail

Educational trails are planned and implemented according to the following procedural framework:

1. Project Planning of the Educational Trail:
 - Assessment of existing natural, historical, and cultural points of interest;
 - Execution of legislative procedures;
 - Analysis and resolution of ownership and user rights within the designated area;
 - Route planning of the educational trail;
 - Preparation of the budget and implementation plan.
2. Project Documentation for the Construction of the Educational Trail:
 - Spatial analysis and territorial relationships;
 - Development of the conceptual design;
 - Content specification for information panels;
 - Design and placement of panels along the trail;
 - Trail marking;
 - Mapping and integration of information panels—terrain-based route design.
3. Establishment of Responsibility for the Educational Trail:
 - Implementation of a regular maintenance system (routine maintenance and repairs);
 - Updates to the educational trail's information panels (BURKOVSKÝ & KRÁLIKOVÁ, 2015).

The educational trail should function as a coherent system, with unified structural elements forming a logical whole aligned with the conceptual vision. Ideally, the development should involve a collaborative team of specialists from various professional fields to ensure project consistency.

A primary principle in route selection is to align the path with the philosophical and interpretive essence of the chosen natural features while avoiding safety-risk areas. Simultaneously, the condition of existing transportation access in the area should be evaluated for possible integration. Accessibility is also vital for both public and private transportation, and the starting point of the educational trail should ideally feature an entry node with sufficient parking capacity and the required recreational infrastructure. The trail route and its markings must enable clear orientation for future visitors. At planned stops, it is necessary to account for the congregation of visitors and ensure adequate space. The distribution of educational content should also be carefully planned. The sequence of stops is determined by terrain conditions, but maintaining logical continuity is desirable. The core of the educational content should be concentrated in the most frequently visited sections.

Trail markings are applied in accordance with standard STN 01 8025 for tourist signage. The trail marker used is a white square (100 x 100 mm) with a 30 mm-wide green diagonal stripe

from the top-left to the bottom-right corner. At each stop, the marker is supplemented with an orange number indicating the stop's order, typically placed on the educational panel itself. Markers are positioned at eye level (150–170 cm) on trees by painting on smoothed bark, affixing stickers or metal plates, or using standalone posts. Markings should be sufficiently spaced so that the next marker is visible from the previous one, particularly at locations where orientation may be lost (e.g., turns, crossroads) (PACHINGER ET AL., 2016).

The fundamental informational component of an educational trail is the educational-information panel. In terms of content design, it is important to immediately capture the visitor's attention and interest, followed by a few concise sentences to establish a connection to the location, even at the expense of professional and technical depth (RÚŽIČKA, 2012). Emotional engagement is prioritized over the transmission of complex scientific data, with emphasis placed on clarity and appeal. The content must be accessible to the general public while remaining professionally accurate and verifiable.

A well-designed educational panel should follow the so-called "information pyramid" model, delivering information at varying levels of detail in an appropriate order of importance. A recommended approach is the 3–30–3 rule, where the panel captures attention within 3 seconds through unique or striking design; retains interest for 30 seconds if the reader engages with bold paragraph text; and holds attention for up to 3 minutes if the topic proves deeply engaging, including more detailed text and smaller graphics (BURKOVSKÝ & KRÁLIKOVÁ, 2015).

Graphic design must adhere to essential schematic principles:

- The trail marker and panel number are placed in the top-left corner, with a potential trail symbol in the top-right;
- The name of the trail and stop appear at the top in the largest font;
- The central area is dedicated to text and visuals (images, diagrams, maps), which should be concise or bullet-pointed rather than overly verbose;
- The bottom section should display appropriate instructional and prohibition symbols and optionally include the identifier of the trail's establishing organization.

It is crucial to consider the international character of the trail when designing content. Panels should include multilingual versions, with primary texts translated into a major global language (e.g., English) and, where applicable, a third language relevant to border or linguistically diverse regions.

In designing the structural components of panels and other recreational infrastructure, multiple factors must be considered. Consistent design should be maintained throughout the trail. Architecturally and visually, elements may incorporate artistic or carved features, but above all should harmonize with the surrounding environment. The design should reflect the specific landscape context—differentiating, for example, between mountainous and urban environments.

Support structures for panels are most commonly made from wood, using either sawn timber or round/polished logs. The panel surface itself may be constructed from alternative materials such as plastic. Panel size is not strictly defined but generally ranges from 80–100 cm in height and 100–120 cm in width, with the panel center positioned at eye level. The structures must be protected against adverse weather. Wood must be treated to resist rot, ideally covered by a simple roof. Direct sunlight can cause fading, so shaded placement is advisable. If the structure is wooden, it should be protected from ground moisture, not buried directly in the soil but mounted on concrete bases using metal fixtures embedded in the concrete.

In addition to signage and informational devices, the trail may also feature various recreational structures situated in rest zones along the route. These may include shelters with seating, rest areas with benches, spring modifications, fire pits, waste bins, dry toilets, and various safety installations to navigate hazardous areas such as handrails, bridges, footbridges, ladders, and chains.

Conclusion

The creation of educational trails represents a valuable means of environmental education, sustainable tourism, and public engagement with natural and cultural heritage. Despite the absence of formal legislative and technical standards in Slovakia, the design and implementation of such trails require careful planning, legal awareness, interdisciplinary collaboration, and a sensitive approach to both content and landscape. By adhering to best

practices in route selection, panel design, and infrastructure integration, educational trails can serve not only as informative tools but also as harmonious elements of the landscape that foster meaningful connections between visitors and their environment.

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Souhrn

Náučné stezky jsou vzdělávací, převážně turistické trasy různé délky a obtížnosti, které vedou přírodními, kulturními či regionálně zajímavými lokalitami. Poskytují důležité informace o krajině, kulturně-historických památkách, ochraně přírody, životním prostředí či o lidských aktivitách v krajině, a zároveň představují ideální vzdělávací nástroj pro udržitelný rozvoj, environmentální vzdělávání a výchovu.

Práce se zabývá problematikou plánování, projektování, trasování, realizace a údržby naučných stezek. Zároveň zpracovává legislativní podmínky vyplývající z obecně závazných právních předpisů, jejichž splnění je nezbytné pro realizaci naučné stezky.

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