

Route options in inclusive museums: Case studies from Central Europe

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Abstract: Museums are complex architectural works with many distinctive elements. One of the most significant museum features are routes or paths on which visitors circulate museums and perceive exhibitions. Children and people with special needs often have specific demands on physical accessibility of the surrounding environment, chronological arrangement of spaces and amount of information presented at a time. The arrangement of functional units in museum layouts affects wayfinding in space, understanding of the exhibition, as well as visitor guidance. The order in which people visit particular segments in a museum can also be described as one of the most important architectural and operational characteristics of this type of cultural buildings and areas. The article examines ways of arranging spaces in a museum building and the suitability of their application. These forms are evaluated based on various aspects; some of the created effects are studied, e.g. creation of a desired atmosphere. Existing concepts are compared and supplemented with other theoretical knowledge. The article aims to present variant suitable ways of composing routes that would meet the needs of different people, and bring them a quality leisure and educational experience from a museum tour. Various types of museum layout organisation and arrangement of exhibition spaces are illustrated with abstract schemes, as well as with specific case studies of five selected museums. The selection consists of architecturally exceptional and high-quality museums in Central Europe, which are able to attract a whole range of various groups of people including a younger audience. They are examples of both modern museums in this area and route planning options. The case studies highlight interesting local ideas, space concepts, routing methods, and also solutions for increasing inclusion of all visitors and children in particular.

Keywords: museum, children, tour route, inclusion, architecture, exhibition, sequence

INTRODUCTION

Interactive or hands-on museums provide an opportunity for extracurricular education in a playful way, encourage creativity and imagination, and broaden the intellectual horizons. Museums can inspire children and the young in particular, because young people have a greater potential to expand their less-defined interests (in comparison to adults), increase enthusiasm for education, shape them, and perhaps even influence their choice of future profession. The importance of experiences and education in museums is addressed by several authors, such as Graham Black (Black, 2012, 2015), John H. Falk, Lynn D. Dierking (Falk, Dierking, Lynn, 2018), Tim Caulton (Caulton, 1998) and George E. Hein (Hein, 1998). By developing their positive attitude towards cultural facilities at an early age, it is possible to encourage children's curiosity and self-confidence in education, discovery and communication, and to maintain their interest in museums and galleries in the future. Particular emphasis should be placed on museum's accessibility and the inclusion of people with disabilities in all the activities a museum has to offer. It is crucial for museums and other public buildings to welcome all visitors with various needs equally. In the context of inclusive education, Vladimír Jůva (Jůva, 2004, p. 156)

emphasizes the importance of inclusion of children and young people with special needs in all spheres of contemporary life. As Meredith Banasiak (Banasiak, 2020, p. 231) states, museums' exhibitions and exhibits are an integral part of museums, they are therefore currently presented in various multisensory and interactive forms. Black (Black, 2005, p. 131) also highlights the opportunity to participate directly in individuals' experiences and support the diversification of their audience. People need appropriate conditions for learning and creativity; they can better concentrate on gaining knowledge or discovery in a well-designed, structured environment – for example, in the interest of inclusion, it is necessary to take into account principles of universal design. Therefore, the accessibility and order and amount of information or exhibits are very important in this regard. Hence, in this article, special attention is paid to different kinds of routing systems and space segmentation in museums. Moreover, the importance of museums extends also to playful experiences contributing to healthy development and contentment of children. Meaningful and creative (structured) play can be therefore supplemented with "immediate activity" of "free play" mentioned by Lívía Kožušková (Kožušková, 2017), where children are given freedom to choose their playful activities.

Furthermore, opportunities for play and discovery in museums “for all visitors” also extend to supporting inclusion in communication and cooperation among them, and strengthening family, friendship and multigenerational relationships. In this context, according to Muna Silav (Silav, 2014, p. 358), children’s museums especially help “develop social relationships among children by creating opportunities for solidarity and cooperation.” A playful and encouraging vibe of the space can be achieved by various architectural and design solutions, interventions in the form of sensitively inserted interiors, cosy semi-open nooks, or even through appropriate furniture, materials, colours etc. Clear wayfinding options and landmarks also positively influence well-being and atmosphere of the space. Together with other factors, they encourage inclusion: equal use, accessibility, flexibility, adaptability of spaces and elements (CABE, 2006).

RESEARCH SUBJECT, METHODS AND AIM

The main focus of this research is on the study of routing options by means of theoretical desk research, their application in practice through case studies, and analysis of their suitability for children visitors. Furthermore, additional characteristics of museum spaces are considered, mainly their atmosphere and inclusiveness for all. This research forms part of a broader doctoral research; a brief summary of the findings has been presented and published at Point for science, a platform for doctoral presentations (Filová, 2021).

Firstly, desk research was conducted. For purposes of this survey, Ernst Neufert’s (Neufert, 2019) typology was used that summarizes the types of layouts, and also indicates relevant routing options. In addition, findings of Paul von Naredi-Rainer and Angelika Schnell (Naredi-Rainer, Schnell, 2004) focused primarily on routing in the exhibition spaces were considered. The topic is also enriched with information from other authors, such as Uriel Cohen with Ruth McMurtry (Cohen, McMurtry, 1985) and John Pearce (Pearce, 1998). A comparison of the approaches of the aforementioned authors is also supplemented with theoretical assumptions of the authors of the paper.

Secondly, the research continued with practical analysis of selected museums as case studies, using theoretical knowledge and applying it to museums in Central Europe, as this paper is linked to other research conducted in the region. Therefore, Slovakia and four neighbouring countries were selected. The selected buildings meet the following conditions: 1. They are located within 150 km from Slovakia at maximum; 2. They have suparegional significance, thus they are relevant; 3. They were created in the period of 2000 – 2020, so they are contemporary structures and meet accessibility requirements; 4. Their layouts include different types of route arrangements, so they are suitable for comparison.

The following methods were used: on-site observations, interviews with staff and experts on museums when possible, and information search on museum websites and in printed materials. We personally examined the individual museums and described them. Inclusion in museums was evaluated similarly to Access Audits realised by members of Centre of Design for All (CEDA) in various buildings’ evaluations. The audits are conducted according to CEDA’s Access Audit Checklist based on the principles of Universal design. Comparable methods are frequently applied also in other authors’ works in CEDA. For example, Access Audits of various objects including museums, galleries and other cultural institutions in Slovakia are often performed also by students of the Faculty of Architecture and Design STU within the compulsory course Universal Design. Some of these findings have been published in Culture for All (Čerešňová, 2009).

Graphic materials of the selected buildings underline the explained phenomena. They consist of diagrams, authors’ own photo documentation and researched original project documentation, on which markings with tracing of possible routes are presented. The expected outcome of the paper is taking several mentioned authors’ and also our own theoretical reflections into account, summarizing and comparing them, but also discovering new remarkable elements or combinations of accessible routing systems through case studies. Overall, this study aims at researching theoretical background concerning routes in inclusive museums and reflection of these ideas in practice. The research analyses various known possibilities of creating exhibition paths in museum buildings; it does not intend to unify design principles, only to provide a positive inspiration based on existing layout-type options and their combinations. The awareness of past variants and current creations may lead to diversity of approaches in the future, or even the emergence of innovative design ideas.

DESK RESEARCH: ACCESSIBLE EXHIBITION ROUTES

Routes can result either from architectural design of the building or from the exhibition arrangement. According to Cohen and McMurtry (Cohen, McMurtry, 1985, p. 30), the exhibition routes have greater potential than just guiding the flow of museum visitors. The accessible route determines the sequence of information, activities and objects, it can also tell a certain story, which is one of the most sought-after elements for people in general, as Ann Sussman and Justin B. Hollander (Sussman, Hollander, 2015, p. 7) claim. The layout operation concept and architectural formation of a museum building are closely related to the creation of routes and potentially also to telling stories that can be perceived by at least two senses (e.g. sight and hearing).

The following analytical part of the research contains a comparison of spatial concepts described by Neufert and Naredi-Rainer with Schnell, taking into account works of other writers and findings of authors of this paper, as well. Neufert (Neufert, 2019, p. 386) mentions six basic types of exhibition space layout and the layout concept: 1. Open Plan, 2. Linear Chaining, 3. Round Tour (Loop), 4. Core and Satellite Rooms, 5. Labyrinth, 6. Complex Layout. Naredi-Rainer and Schnell (Naredi-Rainer, Schnell, p. 66) also list six types of spatial layout and routing in museums (Fig. 1). This categorization mainly applies to layout shaping methods and is reflected in museum floor plans. The primary classification of the layout schemes of the museum space is that by Neufert, because it contains also original diagrams and Neufert’s works are recognised in a broader sense in other areas of architectural planning, as well. On the other hand, Naredi-Rainer’s layout schemes were studied mainly on the basis of texts and groups of selected museums by this author; it is a more subjective point of view. Naredi-Rainer’s suggested layout designs are more loosely conceived and sometimes overlap with several of the aforementioned types classified by Neufert. The Naredi-Rainer classification can be therefore viewed as information additional to the main classification by Neufert, with several possible points of contact with listed layout types; they are not parallel classifications.

These layout arrangements provide visitors with different experiences from a museum tour. This paper focuses on the characteristics affecting inclusiveness, wayfinding and well-being, especially for children, but also for people with diverse needs. The characteristics of each of these layout types are as follows: “Open plan” is an important and widespread type of layout. It can generally be considered the least distinctive space of the aforementioned categories, providing the most indifferent “background” for an exhibition. Minimalist architecture makes

exhibits stand out, and the viewer's attention can be fully focused them due to the absence of a significant architectural arrangement. However, some examples of implementation of open floor museum plans are no longer perceived as neutral covers only, as they also "carry" the atmosphere and have recognizable characteristics. In terms of good orientation and clarity, this type of layout offers the greatest potential benefits if a navigation system is created. An elaborate design of the exhibition itself is essential, because in the case of the open plan, the curatorial design is the determining factor. Too much open space without thoughtful navigation can reduce concentration of visitors due to disturbing factors (circulation of people, acoustics, etc.). Children in particular are disturbed by overly open spaces; therefore flexible panels and dividing furniture are often utilized.

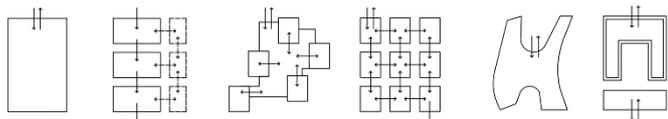


Fig. 1. Scheme of six basic types of exhibition space Layout according to Naredi-Rainer and Schnell (Naredi-Rainer, Schnell, p. 66): 1. Open Plans, 2. Directed Sequences of Rooms, 3. Spatial Interpenetration and Spatial Isolation, 4. Matrix-like Arrangement of Rooms, 5. Free-form Spaces, 6. Conversions and Extensions of Architectural Monuments. (Author: Natália Filová, inspired by descriptive texts by Naredi-Rainer and Schnell (Naredi-Rainer, Schnell, p. 66))

Another layout type is "Linear chaining", which is similar to "Directed sequences of rooms". They are interconnected in such a way that room doors are placed on one axis and allow multiple transparent views. This layout is characterized by a relatively strict order of exhibition parts. It is necessary to work with this aspect while planning an exhibition, because the sequence of exhibits has a great impact on continuity and visitors' understanding. A possible disadvantage of this layout is that it can become too repetitive, when there are many connected rooms. However, there may also emerge alternative routes, such as side routes parallel to the main one, but the core direction of the tour remains recognizable. Alternative routes can enrich the exhibition routing; they stimulate mystery, discovery, imagination, creativity and also provide privacy. "Round tour (loop)" is a variation of these types, because it also contains a programmed order of rooms, and thus a clear route of the tour, but it is no longer linear but cyclical. This layout composition provides an opportunity for appropriate information delivery and structuring, so also for good orientation and clarity.

"Spatial interpenetration and spatial isolation" are another type of museum arrangement; they combine ideas of flowing space and pavilions (Naredi-Rainer, Schnell, p. 143). A related scheme according to Neufert's classification is more difficult to assign, but it is possible to draw a certain parallel with the concept called "Core and Satellite Rooms" in which the premises are divided into the main room and side rooms, or even into scattered passages or hall spaces, a kind of "base", with exhibition rooms, alternatively pavilions, accessible from the scattered space. This concept can create an interesting solution. The ability of orient oneself in these spaces varies depending on the number of adjacent spaces, as well as their marking or differentiation (e.g. by colour, material, shape, acoustic beacon, etc.). Furthermore, the types of floor plan "Labyrinth" and "Matrix-like arrangement of rooms" can be compared as well. The exhibition spaces are connected in a way that there is no single main route with side routes, but there are several equivalent alternatives for continuing the route instead. This type of layout is characterized by ambiguity, often even difficult wayfinding. However, children in particular enjoy discovery and riddles; therefore, it has the potential to become an experiential path

that is suitable for some exhibition themes. This type is challenging as regards creating a comprehensible space but signs on floors, doors, and the like can help simplify navigation.

The remaining spatial concepts of Neufert and Naredi-Rainer with Schnell are categories that specific and derived to a greater extent. "Complex" layout is a combination of characteristics from several spatial structures of the aforementioned concepts. A recognizable feature of the "Free-form spaces" in museum buildings represents rejection of application of right angle and geometric regularity. This category exemplifies mainly architecture of a museum, which seeks to be a work of art in itself. The layout of spaces and the method of routing can vary between the above-mentioned types of concepts. "Conversions and extensions of architectural monuments" show attempts to coexist with the existing structure. Museums are often placed in historic buildings with various former functions which are modified, rebuilt including the removal of barriers, or a new object is attached to them, located next to or near them. Especially in children's museums, there is a strong trend towards adapting a building which originally served a different purpose to this new function, as stated by Cohen and McMurtry in the context of American museums for children (Cohen, McMurtry, 1985, p. 36).

To conclude, with regard to designing for children and various visitors, there are both advantages and risks in each of the aforementioned layouts. The open plan is the most flexible space of all, if properly designed, it is usually easy to understand, but potential disadvantages include disturbance from excessively open space, agoraphobia or chaotic delivery of information. In contrast to the open plan, sequence of spaces is already divided and proposes didactic sequential ordering of information on exhibition topics, which requires a stricter sequence and amount of information. On the other hand, core and satellite rooms are suitable when presenting multiple equal topics with no need for a specific order. Labyrinth-like layouts are difficult for visitors to understand and orientate, their potential lies in experiential exhibition topics. The rest of the concepts are specific cases with individual positive elements and drawbacks.

CASE STUDIES: MUSEUMS FROM CENTRAL EUROPE



Fig. 2. Locations of museums chosen for case studies. (Author: Filová, 2021)

Selected contemporary museums located in the Czech Republic, Poland, Austria, Hungary and Slovakia are examples of objects harmoniously integrated into urban and natural surroundings, which reflect the genius loci of the place where they are situated. Efforts to emphasize the local identity and uniqueness resonate with the interest in inclusion and welcoming children and diverse visitors. Each of these museums is an architecturally remarkable and professionally recognized building, they are

bearers of various ideas, and have individual characteristics in terms of architectural and artistic solutions. Fig. 2 shows the locations of examined museums. The research focuses on application of some of the above-mentioned theoretical knowledge in the analysis of museums in various contexts, most importantly with respect to the accessible routes proposed by the layouts and spatial planning. The original project documentation found in desk research and during visits to these museums is supplemented with markings of possible routes in exhibition spaces made by the authors of this paper. The markings are illustrative; they do not attempt to reflect precise reality but rather the principles in the routing concepts.

VIDA! Science Centre in Brno

The interactive museum in the Czech Republic is situated in a hall of the former pavilion of an exhibition centre from 1973 designed by architect Zdeněk Denk. The restoration of the object was designed by the studio K4 a.s. (architects Zdena Němcová, Jan Lacina and Vladimír Páček). During the renovation and adaptation of the building to the new function, the original design was respected and complemented using a ramp with an organic shape, which leads to the new main entrance (Fig. 3). However, the ramp should be less steep for people using a wheelchair. The design was implemented in the years of 2011 - 2014.



Fig. 3. VIDA! Science Centre in Brno, Czech Republic: Exterior view. (Photo: Filová, 2019)

The exhibition route is indicated in the open space by means of drawing and projection on the floor (Fig. 4). Four exhibition areas are also colour-differentiated, which significantly helps in navigation. Visitors may or may not respect the recommended route, depending on their interests, time and general preferences. Several possibilities of vertical movement are provided, including one accessible to visitors with reduced mobility. Visitors can visit the interior gallery on the 1st floor using stairs, a lift or an escalator. It is possible to go down using a slide, which is attractive, especially for children.

Exhibition space is an open plan, as can be seen in floor plans (Fig. 5, 6), and also experienced during a personal visit. The space is divided by larger exhibits and a few partitions forming small pavilions. The museum strives to be inclusive and incorporates many accessible elements; this effort could be further supported with an accessible main entrance. Wayfinding in this museum is rather intuitive for visitors of all ages thanks to the indicated route traces. Possible views of the exterior would improve orientation even more. In conclusion, the VIDA! Science Centre in Brno is an interesting example of the transformation of a building that lost its original purpose into an interactive, entertaining and educational place. It is a museum with an open plan layout and free routing, so it provides great flexibility as regards the viewing of the exhibition.



Fig. 4. VIDA! Science Centre in Brno, Czech Republic: Tour route indicated by drawing and projection on the floor. (Photo: Filová, 2019)

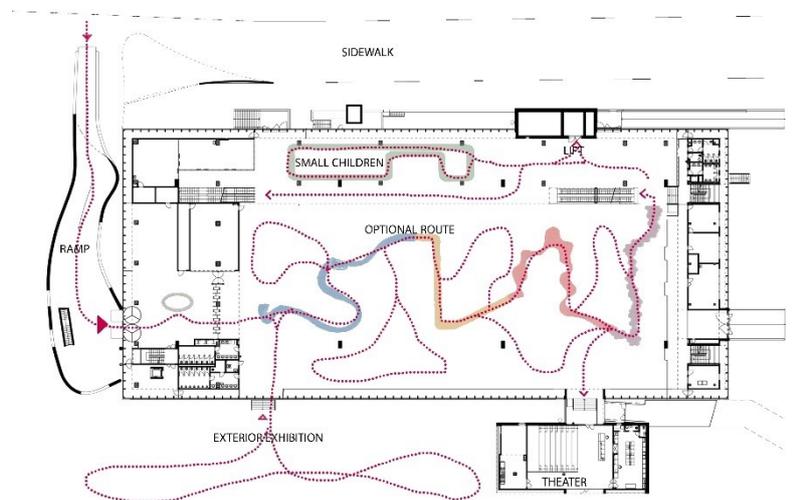


Fig. 5. VIDA! Science Centre in Brno, Czech Republic: Ground Floor. (Source: Floor plan by K4 with markings by Filová, 2021)

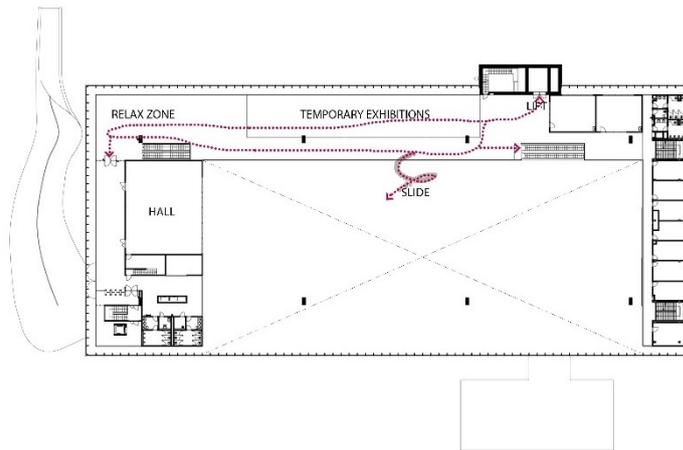


Fig. 6. VIDA! Science Centre in Brno, Czech Republic: 1st Floor. (Source: Floor plan by K4 with markings by Filová, 2021)

Silesian Museum in Katowice

The Silesian Museum, built in 2011 - 2013 in the Polish city of Katowice, is located in the area of former mines (Fig. 7). It has a large floor area in several original and new buildings interconnected with various exterior paths (Fig. 8). Architects Florian Riegler and Roger Riewe chose to locate a large exhibition area mainly underground. Above the terrain, there are abstract glass blocks of various scales, allowing daylight to enter the underground exhibition space. The minimalist glass blocks make the historic architecture of the complex stand out, and emit diffused light at night. Exhibition areas consist of large open spaces, which are in individual zones divided to varying degrees by exhibits, partial partitions or panels, among which it is possible to walk in various ways (Fig. 9, 10). There is also a completely closed organized labyrinth area, where visitors find a very strictly programmed exhibition route with chronological continuity (Fig. 11, 12). Thus, there are several means of routing applied in this museum. Floor levels are interconnected with monumental ramps, stairs and a lift (Fig. 13). The interior design is mostly understandable, wayfinding can be slightly challenging in the labyrinth segment, but it is expected from this type of path. Finally, it can be stated that this is an exceptional example of restoration and completion of a monument area with an architectural novelty. A sensitive, minimalist incorporation of

new formations harmonizes with the historical architecture and complements it. There are several layout designs and paths possible in this extensive museum. Visitors can find open spaces, partially divided (semi-open) areas and labyrinthine layout.



Fig. 7. Silesian Museum in Katowice, Poland: Exterior context. (Photo: Filová, 2019)

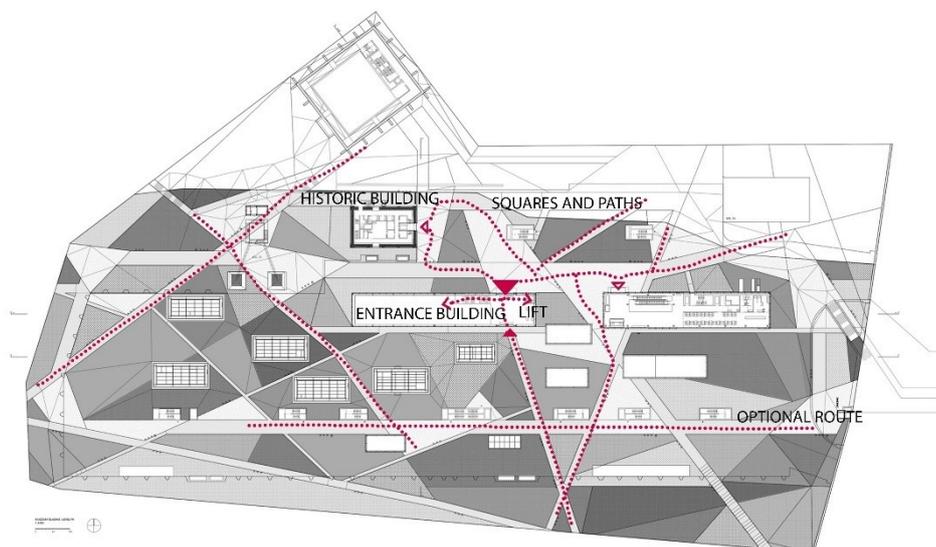


Fig. 8. Silesian Museum in Katowice, Poland: Ground floor. (Source: Floor plan by Riegler Riewe Architekten with markings by Filová, 2021)



Fig. 9. Silesian Museum in Katowice, Poland: Free tour route slightly divided by panels. (Photo: Filová, 2019)

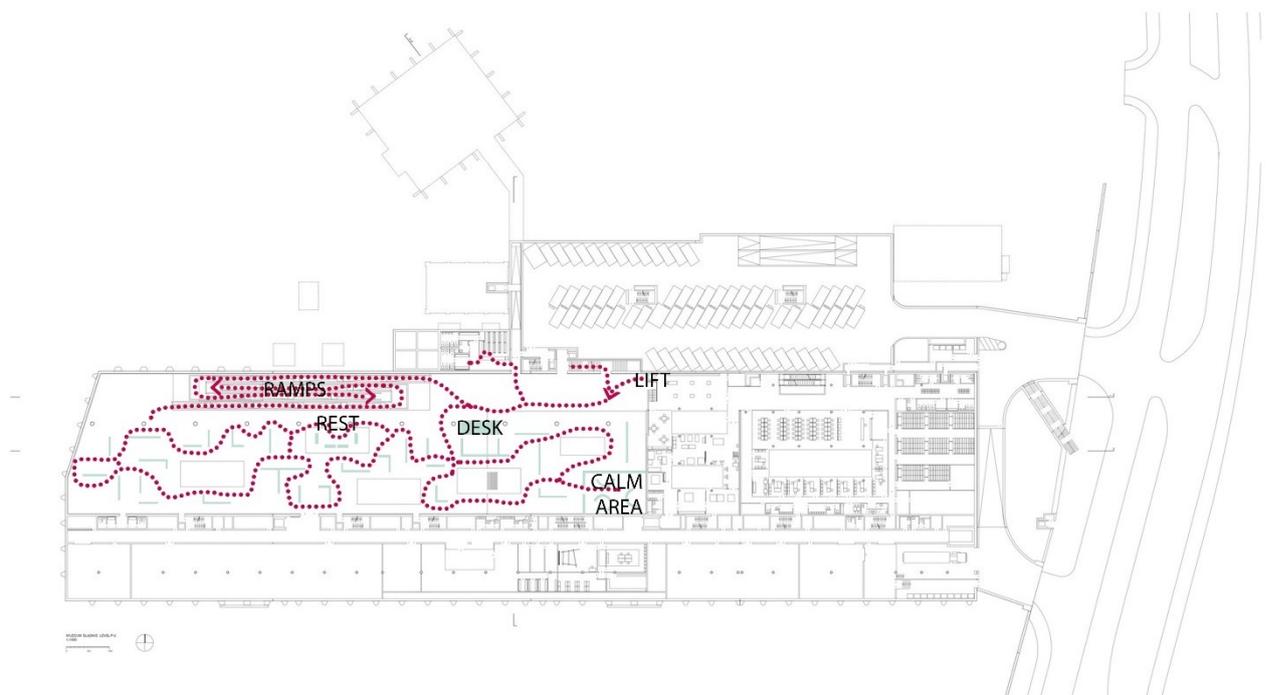


Fig. 10. Silesian Museum in Katowice, Poland: Level -2. (Source: Floor plan by Riegler Riewe Architekten with markings by Filová, 2021)



Fig. 11. Silesian Museum in Katowice, Poland: Strict labyrinthine tour route. (Photo: Filová, 2019)

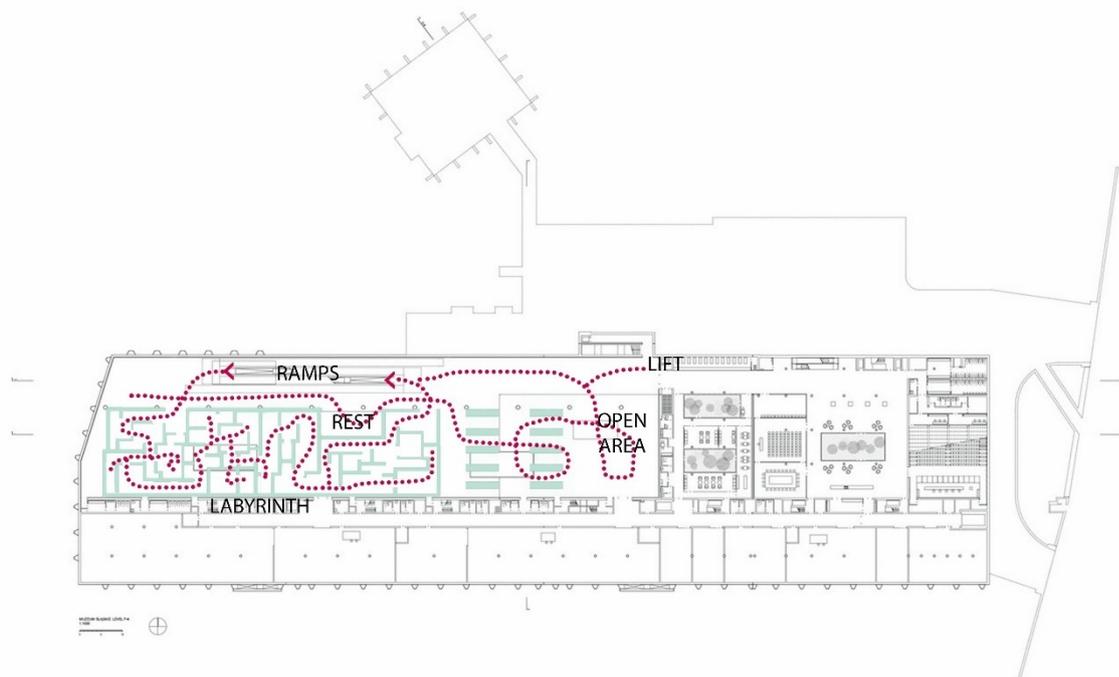


Fig. 12. Silesian Museum in Katowice, Poland: Level -4. (Source: Floor plan by Riegler Riewe Architekten with markings by Filová, 2021)

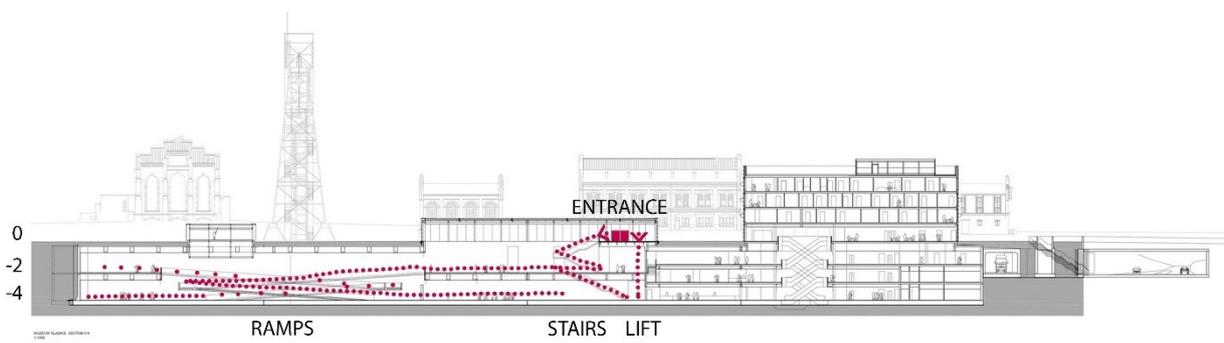


Fig. 13. Silesian Museum in Katowice, Poland: Longitudinal section. (Source: Floor plan by Riegler Riewe Architekten with markings by Filová, 2021)

Lower Austria Museum in St. Pölten



Fig. 14. Lower Austria Museum in St. Pölten, Austria: Exterior architecture. (Photo: Filová, 2019)

The Lower Austria Museum designed by renowned architect Hans Hollein in 2002 and by architectural studio Rata Plan

(RATAPLAN, 2010) in 2009 focuses on the art and history of the region in which it is located, as well as on nature. These specialized segments are spatially and organizationally interconnected into a complex postmodern object (Fig. 14). The common entrance hall with facilities allows access to the exhibition hall with art and historical themes, as well as to the museum part specialized in nature. The left wing is of rectangular shape, and is dedicated to art and history, while the right, more complex shaped mass, covers nature. The connecting part serves as a common area and contains facilities. The nature tract is an example of a more programmed routing. Still, the visitor has the option to choose from several alternative circuits and possibilities for accessible vertical movement – a ramp, stairs and a lift. All these elements are an organic part of the tour, because they are located in the exhibition space and provide a view of it. Ramps are part of the inclusive route, and are quite long in some cases. They form one of the possible routes, and there are exhibits along them (Fig. 15). The hall space with the artistic and historical exhibition provides freedom in creating a tour route (Fig. 16, 17, 18). It is a free floor plan into which panels with exhibits are inserted. Visitors experience a rather free, open path there, in some places with certain denser groupings of panels where the route resembles the labyrinth form. The plastic shape represents the type of “Free-form spaces”; in parts of exhibition panels in the History wing it also combines traits of open space and labyrinth. In summary, this museum with its

dual focus offers an equally dual experience and atmosphere in its concept. First of all, it is a more minimalistic open form of the art and history sector, which allows variable design of the interior using embedded dividing elements. In contrast, there is a more diverse structure of the part dedicated to nature, in which the strongly architectural solution more strictly determines the exhibition route, while exhibits are complementary elements of the interior. This museum is very variable as far as routing systems are concerned. It contains open or semi-open segments, a labyrinth-like structure and a part is a free form space. Such diversity makes it a complex layout.



Fig. 15. Lower Austria Museum in St. Pölten, Austria: Partially programmed routing and a free form space. (Photo: Filová, 2019)



Fig. 16. Lower Austria Museum in St. Pölten, Austria: Semi-open plan divided by panels, slightly resembling a labyrinth. (Photo: Filová, 2019)

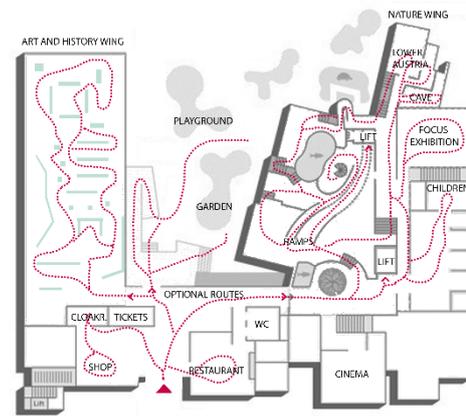


Fig. 17. Lower Austria Museum in St. Pölten: Ground floor. (Source: Floor plan by Niederösterreich Museum Betriebs GmbH with Markings by Filová, 2021)

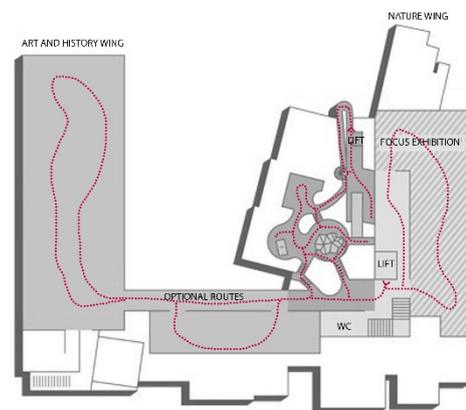


Fig. 18. Lower Austria Museum in St. Pölten, Austria: Level +1. (Source: Floor plan by Niederösterreich Museum Betriebs GmbH with Markings by Filová, 2021)

Kemenes Volcano Park

The Hungarian thematic museum Kemenes Volcano Park in Celldömölk focuses on volcanic activity. In the ancient past, volcanoes existed in this area. The building was completed in 2013, based on the design by the architectural studio Földes Architects. The building visually communicates with its environment using spectacular sceneries visible through the slits and in some places, also through larger glazing. Because of its prismatic shaping, the building evokes a mineral or rock, and with Corten steel or concrete surfaces; in an abstract way, it seems to be carried by flowing and solidified lava (Fig. 19). Numerous steel staircases and ventilation ducts in the open area reach across several floors (Fig. 20), as if there was a volcanic chimney, and footbridges leading through this opening contribute to this effect, and provide visual and physical connection, and also form exhibition routes. However, there is also a lift providing an accessible vertical connection. Visitors often enter the individual exhibition cubes or rooms via the footbridges and the open vertical space, which provide an unusual sequence of the exhibition (Fig. 21, 22). Out of the previously mentioned types of routing, “Core and satellite rooms” and “Spatial interpenetration and spatial isolation” seem to be the closest to this one. Through the common open spaces, even in the form of footbridges, visitors pass to individual mono-functional rooms (Fig. 23). They can choose to use staircases or a lift, so the routes are accessible for all. To conclude, the building is a valuable example of museum architecture, and in its exterior and interior appearance it is in absolute symbiosis with the func-

tional content. Its routing is interesting and connected to the concept of vertical open space of the metaphorical volcano. The types of layout with core and satellite rooms and spatial interpenetration and spatial isolation can be observed in this building.



Fig. 19. Kemes Volcano Park, Hungary: Architecture's relation to the environment. (Photo: Filová, 2019)

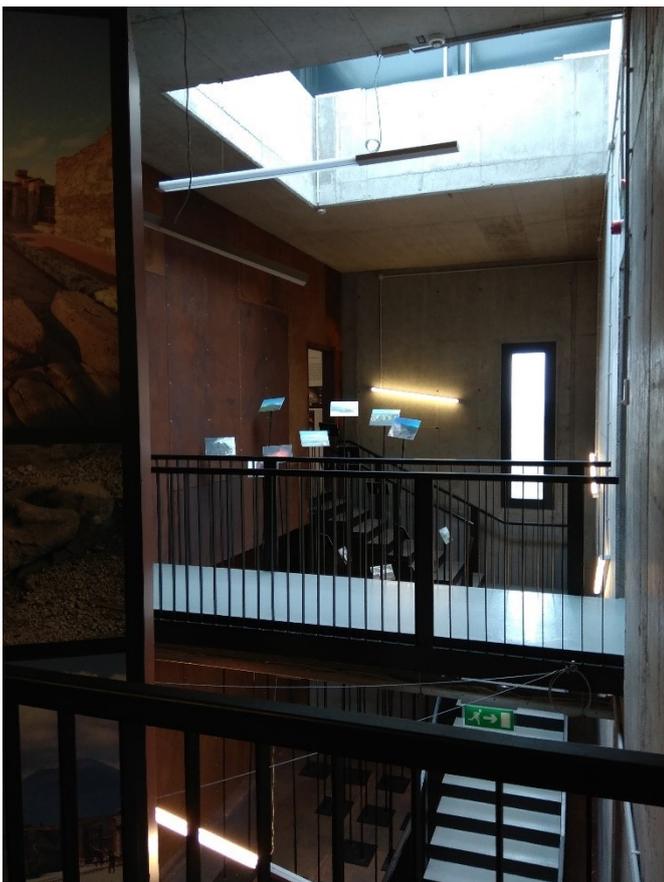


Fig. 20. Kemes Volcano Park, Hungary: Vertical common space. (Photo: Filová, 2019)

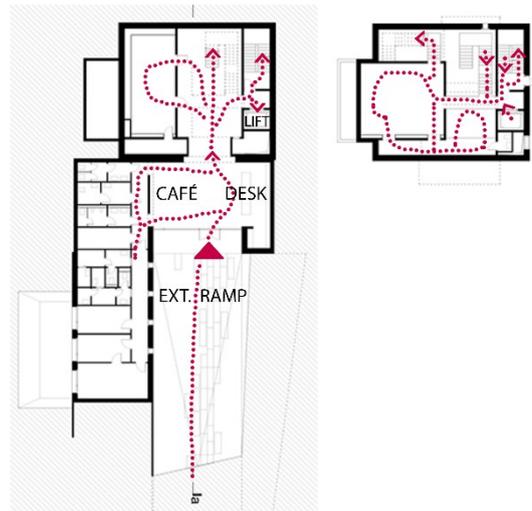


Fig. 21. Kemes Volcano Park, Hungary: Floor plans. (Source: Floor plans by Foldes Architects with markings by Filová, 2021)

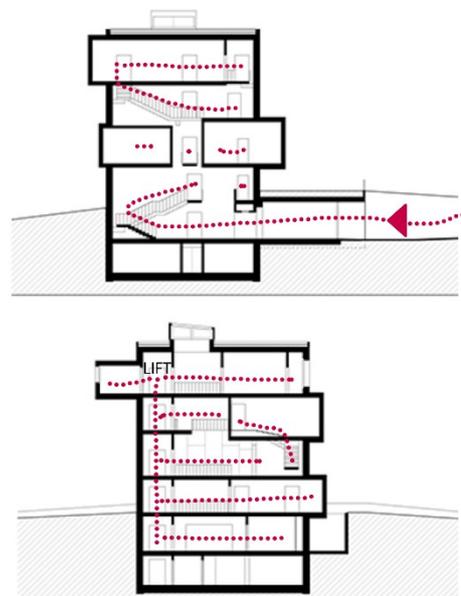


Fig. 22. Kemes Volcano Park, Hungary: Sections. (Source: Floor plans by Foldes Architects with markings by Filová, 2021)



Fig. 23. Kemes Volcano Park, Hungary: Example of a Thematic Mono-Functional Room. (Photo: Filová, 2019)

Kulturpark in Košice

The last analysed case is the cultural complex Kulturpark in Slovakia which was created through the conversion of the premises of former barracks from the end of the 19th century, which was completed in 2013 based on the design by Zerozero studio headed by the architect Irakli Eristavi. The solution respects original architecture and greenery, while sensitively placing new minor constructions in the area. Urban design of the area is connected to existing paths and is open to the city (Fig. 24).

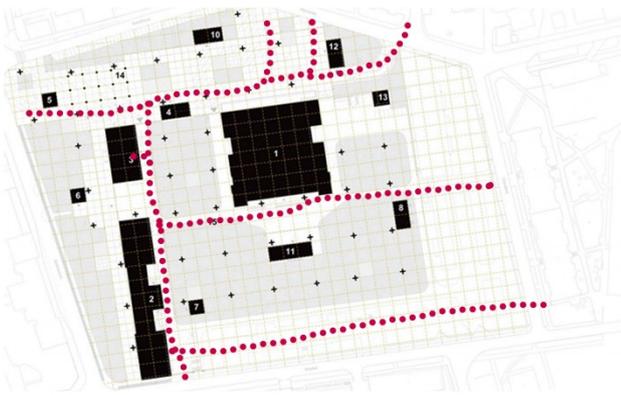


Fig. 24. Kulturpark in Košice, Slovakia: Location. (Source: Location by Zerozero Architects with markings by Filová, 2021)



Fig. 25. Kulturpark in Košice, Slovakia: The Steelpark Museum building. (Photo: Filová, 2020)

It consists of three historic buildings and several new small-scale pavilion solitaires which serve supporting functions, such as an information centre, workshops or a café, and do not compete with historical monuments with the core function. This set of buildings forms a multifunctional cultural centre and one of the buildings is used for museum purposes, which is described the following analysis. It is the Steelpark building (Fig. 25), and it contains a permanent exhibition focused on iron processing which displays a rich variety of exhibits connected with the traditions of the region. Visible brick masonry in the interior creates an aesthetic impression of the original elements of historical architecture. The routing of the exhibition is accessible and easy, as all four floors have an open floor plan without embedded dividing elements (Fig. 26). The layout could therefore be described as a series of halls with an open floor plan and a common vertical opening (Fig. 27, 28), or also as an atypical "Linear chaining" in the vertical direction. All areas for visitors are barrier-free. Overall, the Kulturpark complex has brought a

lot of opportunities to its surroundings. People are attracted to this area for countless purposes, such as relaxation, meetings, visits to diverse cultural, as well as temporary or permanent exhibitions. The layout type is a series of open plans; it can be described as vertical linear chaining, as well.

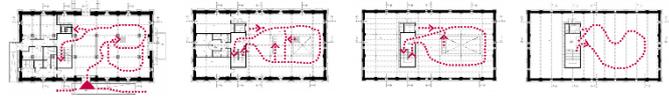


Fig. 26. Kulturpark in Košice, Slovakia: Floor plans. (Source: Location by Zerozero Architects with markings by Filová, 2021)

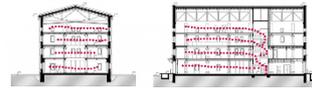


Fig. 27. Kulturpark in Košice, Slovakia: Sections. (Source: Location by Zerozero Architects with markings by Filová, 2021)

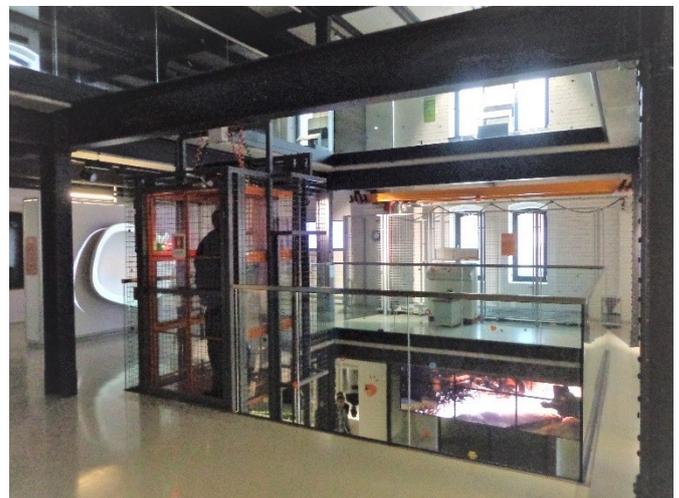


Fig. 28. Kulturpark in Košice, Slovakia: Vertical common space. (Photo: Filová, 2020)

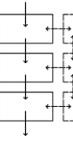
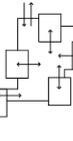
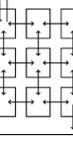
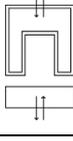
DISCUSSION AND CONCLUSION

Based on theoretical knowledge and conducted case studies, several findings can be derived. Routing possibilities with regards to museum architecture and children visitors are still a very topical issue. Several layout types by Neufert and Naredi-Rainer with Schnell have been considered in the study. Tab. 1 shows a brief summary of findings, and presents an overview of routing systems implemented in museums from case studies. Our findings suggest that an open plan solution shows potential in many ways, including routes and orientation, and is most often presented in case studies. Moreover, large spaces can be divided by subtle elements, by inserted temporary or movable walls, panels or by larger exhibits themselves that can divide the interior into various spatial groupings, thus making it possible to create almost any other spatial layout and routing. The open space is usually filled with embedded exhibits or elements, which gives authors of exhibitions both great freedom and responsibility in creating the route. They must often pay more attention to this aspect than they have to when using other spatial arrangements with already predefined routes, e.g. linear chaining or sequence of rooms is usually easy to understand, as the spaces follow up in a simple way. Navigation in the spatial interpenetration and spatial isolation layout depends on the number and complexity of adjacent spaces, but various mark-

ings can facilitate orientation there. The labyrinthine type is even more complicated, where signs or views of the dominant elements are needed to facilitate otherwise rather difficult way-finding. To make the orientation in all aforementioned routing types possible also for people with visual impairment, it is necessary to use methods like natural and artificial guiding lines (guide tiles), tactile orientation plans or models and descriptions in Braille. All in all, multiple suitable solutions were found

in the research, in which various aforementioned principles were applied or connected to create interesting hybrids. The accessibility of the museum's routes and premises was also examined, as shown in Tab. 2. Orientation, equal use of routes and multisensory means of presentation were selected and evaluated as very important determinants in inclusive museums.

Tab. 1. Brief summary of findings regarding routes. (Author: Filová, Picture source – columns left to right: Naredi-Rainer, Schnell, 2004; K4; Riegler Riewe Architekten; Museum Niederösterreich; Foldes Architects; Zerozero Architects)

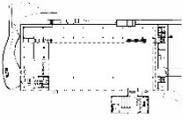
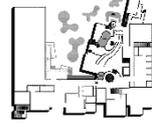
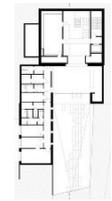
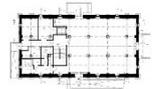
Layout Types	VIDA! Science Center in Brno, Czech Republic	Silesian Museum in Katowice, Poland	Lower Austria Museum in St. Pölten, Austria	Kemenes Volcano Park, Hungary	Kulturpark in Košice, Slovakia
	Open Plan	Open/Semi-Open Plan	Open/Semi-Open Plan		Series of Open Plans*
					*also as Vertical Linear Chaining
				Spatial Interpenetration and Spatial Isolation/Core and Satellite Rooms	
		Labyrinth	Labyrinth		
			Free Form Space, Complex Layout		
		Conversion and Extension of Architectural Monument			Conversion of Architectural Monument

There are also limitations of the study, because the question still remains whether the architects followed the above theories and typologies in their design or designed the layouts entirely based on the assignment and requirements of the museum based on its collection, history and situation. It was probably a combination of multiple factors. Nevertheless, even if it is the case that architects of the analysed museums did not specifically follow the mentioned typological principles, these principles appear commonly, and are intuitively applied by architects.

This research focuses on exploring various solutions in Central Europe to gain local inspiration and better understanding of a

broader context of possible architectural solutions realised in this area, including Slovakia. The wider research synthesised in this paper was followed by more detailed local surveys conducted later. In both their current and future research, the authors concentrate primarily on Slovak museums and galleries and their suitable routing and on meeting the needs of children and people with special needs. Furthermore, this research also shows that the related issue of the degree of closeness or openness of museum premises is an interesting phenomenon to be explored in the future, and routing itself has a potential for further study with focus on vertical opening of museum levels, as it also helps in wayfinding and intuitive movement.

Tab. 2. Brief Summary of findings regarding inclusion of all. (Author: Filová, Picture source – columns left to right: K4; Riegler Riewe Architekten; Museum Niederösterreich; Foldes Architects; Zerozero Architects)

	VIDA! Science Center in Brno, Czech Republic 	Silesian Museum in Katowice, Poland 	Lower Austria Museum in St. Pölten, Austria 	Kemenes Volcano Park, Hungary 	Kulturpark in Košice, Slovakia 
Partial Inclusion Evaluation					
Easy orientation in routes Rationale	✓ Spacious area, many views	X/✓ Very complex, but efforts to incorporate signal points	✓ Many signal points, many views	✓ Compact solution, many views	✓ Compact solution, simple layouts
Equal use of routes for all Rationale	X/✓ Separate barrier-free entry, accessible interior	✓ Common accessible paths	X/✓ Separate interior routes in parts	X/✓ Lift in an eccentric position, staircases in the centre	✓ Use of lift or elevator, or a mechanical pulley (for experience)
Multisensory presentation Rationale	✓ Visual, acoustic, tactile	✓ Visual, acoustic, tactile, even olfactory	✓ Visual, acoustic, tactile, even olfactory	✓ Visual, acoustic, tactile	✓ Visual, acoustic, tactile

Further research will thus concentrate on principles of Universal design implemented in museum architecture with the aim to provide quality experience for all visitors with different needs. Authors' recent audits conducted not only in Bratislava but also with cooperation of students of the course Universal design in Banská Bystrica Region, Slovakia, should be mentioned as well. A total of 12 museums and galleries, including the museum routes, have been examined in recent months with respect to the principles of Universal design. The resulting reports also offer concrete recommendations for the individual museums. In the past, more detailed research was also conducted in Bibiana (Filová, Rollová, 2019), and the authors plan to continue in-depth research there in the future.

In this study, theoretical findings were assessed using five case studies of remarkable museums with various routing options which emphasize their local identity. Unique combinations of space sequence and division show practical application of theoretical layout types found in desk research. The way of guiding visitors around a building and walking them through individual spaces is the key factor for experience, wayfinding, but also understanding, which significantly determines the degree of inclusiveness. Museum routes can thus considerably affect the overall atmosphere and success of the whole building.

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