

Research Article

Non-Ordinary Built Environments and Child Experience in Interior Architecture

Elif ÖZGEN*

Abstract

The potential of non-ordinary built environments, Unusual built environments produce multi-layered spaces where the spatial experience for child users goes beyond conventional design patterns, with sensory, volumetric, and environmental components working together. Underground salt mines offer unique spatial contexts where natural formations and subsequent design interventions are intertwined. The study examines the relationship between the child experience and interior design using the example of Salina Turda; it discusses how play scenarios interact with the spatial environment in underground structures that have been repurposed for tourism. The research is conducted using a qualitative method based on literature review, field observation, and spatial analysis. The findings show that the sensory intensity, volumetric scale, and historical layers of the underground space create a powerful environmental foundation that supports exploration and curiosity in children. However, the fact that existing play areas are largely based on standard and closed-ended arrangements reveals that the potential offered by the natural environment is only partially exploited in terms of creative participation. On the other hand, the unique microclimate and atmospheric characteristics of the underground environment produce an indirect environmental contribution that supports physical relaxation and focus of attention in the therapeutic context of the children's experience. The study presents a conceptual discussion on addressing children's experiences in unusual built environments within the context of interior design; it evaluates the potential that integrating natural, historical, and volumetric characteristics more holistically with play scenarios holds for design. The findings present a guiding framework for developing child-centered design strategies in unusual spatial contexts such as underground environments.

Keywords: Child and space; Underground interior; Playing space; Non-ordinary built environment; Healing environment

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Araştırma Makalesi

Olağandışı Yapılı Çevrelerde Çocuk Deneyimi ve İç Mekân Tasarımı

Elif ÖZGEN*

Öz

Olağandışı yapıları çevreler, çocuk kullanıcı açısından mekânsal deneyimin alışılmış tasarım kalıplarının ötesine geçtiği, duysal, hacimsel ve çevresel bileşenlerin birlikte çalıştığı çok katmanlı ortamlar üretmektedir. Yeraltı tuz madenleri, doğal oluşum ile sonradan eklenen tasarım müdahalelerinin iç içe geçtiği özgün mekânsal bağlamlar sunmaktadır. Çalışma, Salina Turda örneği üzerinden çocuk deneyimi ile iç mekân düzenlemeleri arasındaki ilişkiyi incelemekte; turizm amaçlı yeniden işlevlendirilmiş yeraltı yapılarında oyun kurgusunun mekânsal çevreyle nasıl etkileşime girdiğini tartışmaktadır. Araştırma, literatür incelemesi, yerinde gözlem ve mekânsal analiz adımlarına dayanan nitel bir yöntemle yürütülmektedir. Bulgular, yeraltı mekânının duysal yoğunluğu, hacimsel ölçeği ve tarihsel katmanlarının çocuklarda keşif ve merak davranışını destekleyen güçlü bir çevresel zemin oluşturduğunu göstermektedir. Bununla birlikte mevcut oyun alanlarının büyük ölçüde standart ve kapalı uçlu düzenlemelere dayanması, doğal çevrenin sunduğu potansiyelin yaratıcı katılım açısından sınırlı biçimde değerlendirildiğini ortaya koymaktadır. Öte yandan yeraltı ortamının kendine özgü iklimi ve atmosferik özellikleri, terapötik bir çerçevede çocuk deneyiminde fiziksel rahatlama ve dikkat odaklanmasını destekleyen dolaylı bir çevresel katkı üretmektedir. Çalışma, olağandışı yapıları çevrelerde çocuk deneyiminin iç mekân tasarımı bağlamında ele alınmasına yönelik kavramsal bir tartışma sunmakta; doğal, tarihsel ve hacimsel özelliklerin oyun kurgusuyla daha bütüncül biçimde ilişkilendirilmesinin tasarım açısından taşıdığı potansiyeli değerlendirmektedir. Elde edilen veriler, yeraltı gibi sıradışı mekânsal bağlamlarda çocuk odaklı tasarım stratejilerinin geliştirilmesine yönelik yönlendirici bir çerçeve ortaya koymaktadır.

Anahtar Sözcükler: Çocuk ve mekan; Yeraltı iç mekân; Oyun alanları; Olağandışı yapıları çevre; İyileştirici çevre

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INTRODUCTION

The relationship that child users establish with space is shaped not only by physical criteria, but also by sensory, psychological, and cognitive processes. This multi-layered interaction that the child establishes with his/her environment determines the meaning of the space and the depth of experience, as well as the formal decisions of the interior design. In recent years, it has become evident that the space experience of child users has been extended beyond its physical parameters and handled through multisensory, exploration- and play-based approaches.

Children tend to prefer cave-like playgrounds, and these preferences are explained through evolutionary aesthetic and neuroaesthetic perspectives. Cave environments have served as children's living, playing, and learning spaces since the Paleolithic period; their foresight and prospect-refuge nature provide them with a sense of security. At the same time, the controlled uncertainty in the space triggers curiosity and the urge to explore; such playgrounds activate children's brain reward system, increase dopamine release, and support the formation of positive emotions (Yang & Cho, 2023).

In this context, caves, mines, and unusual public service environments with various functions gain importance as environments that expand children's perceptual boundaries. Underground structures, natural caves, or abandoned industrial spaces carry unique qualities that remain beyond the usual architectural experiences, stimulating children's curiosity, discovery, and sensory awareness. In order to enable the examination of such unusual and multisensory experiences, the concept of "Non-ordinary Built Environments (NoBE)" was defined within the scope of the study and these areas were separated from the areas located underground, evaluated within the scope of artificial, urban and landscape heritage, having unique spatial characteristics and classified as "Underground Built Heritage" (UBH) in the literature.

Considering the historical and physiological characteristics of the salt mines within the specified areas, the unique atmosphere of the natural environment creates an infrastructure that offers health benefits. Salt particles, microclimate conditions, and characteristic sensory properties of underground spaces produce therapeutic effects for many conditions, especially respiratory diseases. To optimize these spaces as healing environments for children, safety protocols, accessibility features, and environmental controls must be incorporated into design strategies, ensuring they are suitable for child users and support healing processes effectively.

Salina Turda, located in the Durgău-Valea Sărată region of Turda, the second largest city of Cluj County in the northwest of Transylvania in Romania, is considered an example that contains these qualities in a concrete way and constitutes the study area. The area, which was a historical salt mine, has now been transformed into a public space for tourists and health purposes, and has become an example of original design that includes children's playgrounds and interior arrangements that support sensory interaction. In this context, the study aims to examine Salina Turda's capacity to produce play-based spatial experiences for child users within the framework of the NoBE approach, which is considered a new concept. Methodologically, the study includes literature review, spatial reading, and on-site observation-based evaluation steps.

The starting point of the research is based on the hypothesis that natural elements and unusual spatial constructions in non-ordinary built environments have the potential to transform children's relationship with space and play behavior. In this direction, the hypothesis is that play environments with natural and unusual spatial features increase children's level of participation, exploration behavior, and depth of experience. The concept of healing effect is: It benefits to work at a level that contributes to the holistic experience quality produced by spatial conditions where play is supported, sensory intensity is balanced, and participation is strengthened.

It is known that play-oriented activities within the space, movement opportunities, exploration opportunities, and arrangements that support children's unique preferences directly shape the spatial experience (Sando et al., 2023; Norouzi & Garza, 2021). Play is not reduced to entertainment; It is considered a form of action that strengthens the child's self-regulation, emotional balance, social interaction, and creativity processes through spatial experience. These qualities, combined with the sensory diversity offered by the natural environment, enhance the experiential intensity of playgrounds. The findings point to the potential of the sample area to produce principles that can be adapted to environments with unusual built environment characteristics rather than providing a generalizable model. Design-oriented interpretations are based on analytical analysis; however, they do not contain empirical user data. The research reveals the potential and limitations of the field by evaluating the existing play and spatial arrangements in line with the determined analytical criteria.

The study provides an analytical basis for the play-oriented evaluation of children's spaces in the context of unusual built environments. This framework provides the opportunity to examine the impact of future design decisions on children's participation, discovery, and depth of experience. In addition, the conceptual structure obtained contributes to the literature with NoBE, a new concept production, and creates a reference point for reconsidering public spaces containing natural elements and non-ordinary spatial constructions from the perspective of child users and adapting them to different examples of play-centered design strategies.

THEORETICAL BACKGROUND

The relationship between the child and the environment represents a multi-layered process in which developmental, psychological and spatial dimensions are evaluated simultaneously. In terms of design disciplines, the child's interaction with the environment is not only shaped by physical stimuli, but also perceptual, cognitive and emotional processes emerge as an integral part of this relationship. In the context of interior design, the child is not considered as a user who passively consumes the environment, but as an active subject who establishes meaning, transforms space through experience, and produces creative responses to spatial arrangements. The differentiation of children's perception of the world from adults is explained by the quality of their developmental stages and their interpretation of environmental stimuli primarily through bodily movement and sensory information (Tarçın Turgay & Tunçok Sarıberberoğlu, 2022). Therefore, it is seen that spatial experience has a more holistic, movement-based and sensory-intensive character for children.

It is known that areas located underground, considered within the scope of man-made, urban and landscape heritage and with unique spatial characteristics are examined under the title of "Underground Built Heritage" (UBH) in the literature (Kimic et al., 2021). The UBH approach allows the structures in question to be defined in terms of cultural continuity, geological authenticity and heritage value; It offers a framework in which archaeology, conservation and tourism disciplines are predominant. However, the context offered by the concept of UBH remains limited to make a comparative analysis of the child's experience, perceptual processes, and interior design. Salina Turda, the study's area of study, while preserving its heritage nature, necessitates a broader theoretical framework with spatial experience, sensory intensity, and user interaction. In other words, these qualities remain functionally limited for heritage-oriented evaluations. The historical and conservation-oriented nature of UBH does not make it enough to analyze the relationships that underground spaces establish with contemporary user profiles, especially in the context of remedial design principles and play-supported spatial interactions.

The study has a fieldwork approach to space formation with its unusual spatial atmosphere, high originality value and multi-layered sensory stimuli. For this reason, in order to overcome the mentioned limitations, the concept of "Non-Ordinary Built Environments" is defined for the first time in this study and proposes as a new framework for the literature. Thus, the concept becomes a part of the original methodological approach of the study and provides an explanatory frame of reference

in both theoretical and practical evaluations. Although the concept is proposed as a unique nomenclature, it derives its content entirely from features such as unusual morphology, high sensory stimuli, complex spatial atmosphere and the combination of cultural-natural components described in the literature.

For this reason, the "NoBE" used within the scope of the study describes not only formally unusual built environments, but also all experiential environments that create sensory intensity, produce psychological effects and strengthen the user's spatial awareness. The concept is a conceptual approach that aims to evaluate non-ordinary spatial qualities, which are scattered in the literature, under a holistic framework, and in the context of this study, the Salina Turda genre is defined to analyze hybrid, atmospheric and multi-layered spatial patterns. Therefore, NoBE aims to contribute to creating environments where nature-culture boundaries become permeable and unusual spatial organizations trigger children's feelings of curiosity, discovery, and creativity. These environments, with their structures containing uncertainty and exploration, strengthen children's bodily movements, social interactions and spatial memory formation. NoBE features in brief;

- Including unexpected spatial arrangements,
- Sensorially intense,
- Multi-layered stimulus structure that can affect physical-emotional-cognitive processes,
- High authenticity value that determines spatial experience,
- Containing natural elements,
- Differentiated from ordinary urban or architectural patterns by physical and sensory qualities,
- It has a hybrid character where natural formations and artificial arrangements are intertwined,
- To create unique psychosocial and perceptual factors that affect the relationship of users with space.

When evaluated in terms of design theories, non-ordinariness gains importance not only as a formal feature, but also as a functional element that reconstructs the user experience. Each different spatial order that the child encounters contributes to the strengthening of environmental memory, the testing of sensory integrity in new contexts and the development of aesthetic sensitivity. For this reason, the interior is not only considered as a background where actions take place, but also as an active actor that determines the direction of the experience. The environments evaluated within the scope of NoBE offer unique spatial opportunities that enrich children's sensory profile, stimulate curiosity and discovery processes, and open the criteria of healing space to discussion through a different context.

This theoretical background provides a strong foundation for a holistic understanding of the child experience in unusually built environments, establishing theoretical connections to interior design, and discussing how the NoBE approach intersects with the concepts of children's play behavior and healing space. Thus, in the following parts of the study, the relationship between play, healing process and spatial perception is reinterpreted in the context of NoBE, and the example of Salina Turda becomes readable through this theoretical framework.

Children's Play Experience and Spatial Perception in the Context of NoBE

Play, as the main activity of childhood, has a decisive position in the spatial context. Play practices based on volunteering and intrinsic motivation show a positive relationship with children's well-being level, environmental participation, and physical activity capacity (Sando et al., 2023). Play and learning are healing processes that feed each other; It is stated that deep learning is strengthened in environmental conditions where the child feels safe and comfortable (Laevers, 2000; Pramling Samuelsson & Johansson, 2006; Pellegrini & Smith, 1998). It is stated that children whose well-being level is supported have increased attention spans and interact more intensely with spatial stimuli (Sando et al., 2023).

Playing practices are differentiated through open and closed-ended (structured, instructional, goal-oriented, "as is" dimension play etc.) activities. Open-ended (free, unstructured, unorganized physical activity, "as if" dimension play etc.) play develops in free choice and unstructured environmental conditions; It supports the production of imagination, discovery, and experience. Closed-ended play, on the other hand, is associated with activities that are structured in line with specific goals and involve adult guidance (Şengül & Erkut, 2025; Zhang et al., 2025). These two forms of play are directly linked to the diversity and arrangement offered by spatial organization.

Children's spaces differ from environments designed for adult users in terms of developmental and emotional needs. It is expected that the spatial setup for children will have features that strengthen the sense of trust, reduce stress levels, and support social interaction (Gaminiesfahani et al., 2020; Goel et al., 2024). Addressing social and ecological needs together highlights the interdisciplinary nature of architecture (Karayama & Hekimoğlu, 2022).

Underground mines, which are non-ordinary building environments, are complex spaces formed by the combination of industrial heritage and geological processes, different from traditional structures (Kimic et al., 2021). The resulting volumetric complexity produces an intense experiential atmosphere through light-shadow transitions, surface texture, and acoustic properties. The unusual spatial layout increases the child's curiosity and discovery tendency; it creates a ground that contributes to the diversification of the game (Sando et al., 2023).

Studies on space perception show that children experience the environment in a multisensory and bodily way, unlike adults. Visual stimuli alone are not decisive; tactile, auditory, and kinesthetic inputs strengthen spatial memory (Tarçın Turgay & Tunçok Sariberberoğlu, 2022). This approach makes multisensory experience a fundamental criterion in the evaluation of children's spaces.

For a qualified spatial experience, "detailed scenarios" should be created that center on the physical characteristics, interests, and needs of the user (Gençaydın & Orhan Yılmaz, 2025). It is expected that spaces for children in the built environment will be designed in a structure that supports the sense of autonomy, responds to sensory needs, and strengthens social interaction opportunities. Design components such as light pattern, color usage, acoustic control, and wayfinding support directly impact the quality of the experience (Yu et al., 2024).

At this point, design components are considered not only as physical arrangement decisions, but also as experiential thresholds that determine the quality of the relationship that the child user establishes with the space. The depth of the child's interaction with the environment is evaluated together with the trust, curiosity, and participation opportunities offered by the spatial setup. This approach allows play to be read not only as a developmental activity, but also as a process that has the capacity to produce psychological regulation and emotional balance.

Play, Therapy, and Spatial Context

Play, as one of the basic and vital activities of childhood, has decisive effects on social, emotional, and cognitive development. Within the scope of experiential theory, play represents a basic approach to understanding the emotional and social state of the child. It is explained through the concepts of well-being and involvement. Well-being refers to the degree to which the child feels comfortable, lively, self-confident, and spontaneous; participation refers to the capacity to focus on the activity and deepen. It is stated that intense participation is not sustainable in cases where basic requirements are not met. The intersection of well-being and participation creates a threshold that paves the way for in-depth learning (Laevers, 2000, cited in Sando et al., 2021). The deep learning process is directly related to environmental arrangements, interaction with objects, and sensory inputs offered by spatial experience.

The built environment is not only based on physical boundaries; it is shaped through holistic components such as light, water, material, air movement, and atmosphere. Norberg-Schulz's (1980)

spatial spirit approach reveals that the relationship between environmental characteristics and well-being involves a multi-layered interaction. It has been shown that children's emotional regulation capacity is strengthened and their stress levels are reduced in places with high environmental quality (Day et al., 2000; Marquardt et al., 2014). In this context, spatial context is not a passive background that determines the quality of play behavior; It is positioned as an active component that structures the experience.

Play behavior carries a therapeutic dimension due to its capacity to regulate emotions, communicate, and transform the experience. Play behavior is associated with emotion regulation and communication processes; It is stated that well-being is strengthened in cases where participation deepens (Laevers, 2000; Ulrich, 1991). Opportunities such as rhythmic repetition, movement, tactile experience, symbolic representation, and manipulation reduce the child's inner tension and reinforce the child's sense of trust. The basic approach of play therapy reveals that activities directed by the child with free choice strengthen emotional expression and support the ability to cope with stress. The strengthening of the therapeutic effect is possible in environments where the stimulus level is balanced, the boundaries are understandable, and the feeling of trust is supported. Sensory balance, visual simplicity, material diversity, and movement possibilities in spatial arrangements are among the environmental inputs that support the process (Ulrich, 1991).

The play is used and evaluated in various spatial function areas as a form of intervention that facilitates coping with fear, anxiety, and pain (Koukourikos et al., 2015). Supportive Design Theory argues that stress can be reduced through environmental regulations. Arrangements that offer a sense of control, spaces that provide access to social support, and positive distractions contribute to reducing stress levels (Ulrich, 1991; Goel et al., 2024). Positive distractions evoke positive emotions and reinforce the feeling of trust by distracting them from challenging stimuli (McLaughlan et al., 2019). Evaluations in the context of child health show that play and distraction strategies are among the supportive design parameters (Gaminiesfahani et al., 2020).

At this point, the concept of improvement is considered as an indirect result of the environmental conditions that support play behavior, rather than being a direct intervention of the spatial context. The healing approach is associated with a situation in which the individual feels physically, emotionally, and socially balanced; health is defined not only by the absence of disease, but by a holistic state of well-being (Hasol, 2008). Emphasizing the effect of the built environment on well-being, the studies show that architecture does not only produce a functional shell; It shows that it directs the experience with components such as atmosphere, climate, materials, and energy (Day, 2017; Day et al., 2000; NHS, 2014; Verderber, 2010). In this approach, healing space refers to design strategies that make it possible to achieve the targeted state of well-being.

In the context of the child user, flexibility, modifiability, and versatility are prominent design parameters. Arrangements that can be transformed in a short time and promote a sense of autonomy increase participation and strengthen the therapeutic effect (Norouzi & Garza, 2021). The capacity of design to produce excitement, hope, and positive emotions constitutes the spatial equivalent of well-being (Sungur Ergenoğlu, 2006). Environmental diversity and unexpected variables support exploratory behavior and creative engagement (Zhang et al., 2025; Mårtensson et al., 2025). Spatial opportunities that encourage imagination strengthen the capacity for social interaction and learning (Henriksson et al., 2025; McLaughlan et al., 2019). It is also revealed that natural and diverse outdoor spaces exert restorative effects on self-regulation and well-being (Mårtensson et al., 2025).

In addition, important benefits for physical healing are also provided in structures such as salt mines. In particular, atopic (allergic) asthma is the most common type of asthma in children. It appears to be directly related to hypersensitivity of the airways to the allergen (Akar-Ghibril et al., 2020, cited in Allahverdiyeva et al., 2023). It is stated by various studies that the moisture balance created by salt crystals supports the breathing cycle, especially in children with breathing difficulties (Toma &

Irimuş, 2013). Children benefit from the unique microclimate of salt mines, particularly for the treatment of respiratory diseases such as atopic bronchial asthma, which forms the basis of spatial arrangements (Allahverdiyeva et al., 2023).

Therefore, it is understood that there is a reciprocal and dynamic relationship between play behavior, physical, psychological, and social recovery, and spatial context. Spatial design strengthens the play-based experience to the extent that it offers a fiction that responds to children's sensory, emotional, and social needs; It creates an indirect infrastructure that contributes to well-being. This theoretical framework allows examples with unusual spatial atmospheres to be evaluated through child-centered experience.

CASE STUDY: SALINA TURDA

Historical Background

Salina Turda is an important industrial heritage site in northwestern Transylvania, located about 6 km northeast of the city center of Turda, and is classified as a category A monument on a national scale (Ghiurco-Porumb, 2017; Kimic et al., 2021). The large cavities that develop underground are today evaluated together with the salt lakes located within the borders of the "Sărăturile Ocna Veche" nature reserve.

It is accepted that salt production dates back to the Roman period; The management that continued throughout the Middle Ages evolved into underground mining, paving the way for the opening of different galleries and wells. The Franz Joseph Gallery, built in the 19th century, has been one of the main interventions that clarified the spatial organization of the mine, with its length reaching 917 meters (Kimic et al., 2021). Theresa, Rudolf, and Ghizela sections were included in the production at different times; however, activities ended in 1932 due to economic and technical reasons (Ghiurco-Porumb, 2017).

With the comprehensive transformation process initiated in 2008, the building was opened for tourist use with contemporary interventions and re-functioned in 2010 (Morea et al., 2016). The coexistence of industrial heritage texture and modern additions has transformed underground spaces from just a preserved production space into a space of public experience (Kimic et al., 2021).

Today, the area, which is operated under the local government, is located in a holistic visit network with the tourist units around it (Salina Turda Eu, n.d.). This historical stratification and re-functioning process makes visible the coexistence of natural formations and contemporary spatial arrangements; It forms a basic basis for understanding the current multi-layered usage structure of the area.

Spatial Configuration and Repurposed Areas

Salina Turda preserves historical mining traces with its multi-layered spatial weave that develops underground, while exhibiting a reconstructed structural integrity with contemporary usage scenarios. Galleries belonging to different periods, large volumes, vertical circulation elements, and geological gaps constitute the basic spatial components that determine the character of the area. This unique volumetric setup produces a holistic visitor experience with circulation lines and thematic sections added in line with touristic functions.

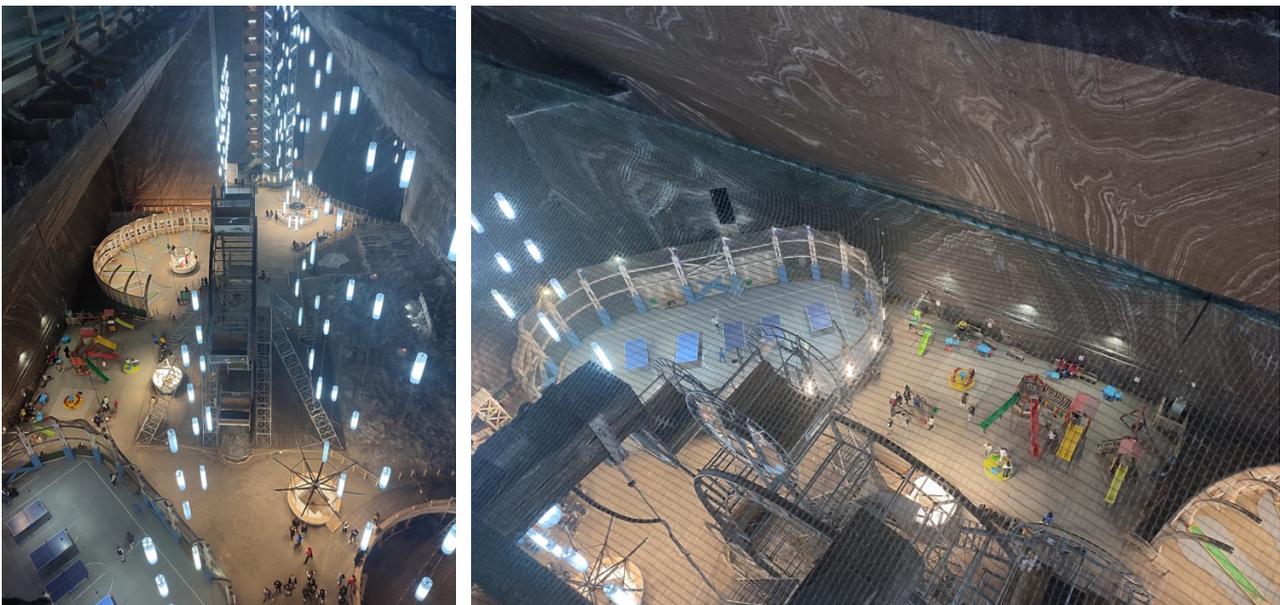
The coexistence of historical continuity and contemporary interventions makes the area a multifunctional underground complex focused on entertainment, recreation, and relaxation. However, underground space-specific conditions such as the dramatic impact of large-scale voids, limited daylight, difficulty in navigation, and acoustic echo can create different experience thresholds, especially for the child user. That shows that spatial immersion may not produce the same level of

positive response for every user, and it is necessary to evaluate the limitations of the space as well as its potential. The areas functioned in the mine and were offered to the users.

- Rudolf Mine: Organized as a large-scale main recreational volume with an average length of 80 meters and a width of 50 meters, located at a depth of approximately 42 meters. The trapezoidal space brings together mini golf tracks, sports fields, billiards and table tennis areas, and playgrounds for children in the same spatial framework. In addition, an amphitheater with a capacity of approximately 180 people, a panoramic Ferris wheel, and a glass elevator that offers the opportunity to watch the whole place are among the remarkable elements of the recreation program. In official sources, the section is described as "Amusement Park" (Salina Turda Eu, n.d.).

This intense programmatic diversity creates a strong experience that nurtures a sense of movement, discovery, and visual curiosity for the child user. However, the dramatic scale of the large volume, the acoustic reflections of the high-ceilinged space, and the simultaneous presence of different activities can increase the sensory intensity. Entertainment-oriented spatial functions require questioning the balance between open-ended play and more defined activities. While spatial immersion has the potential to increase engagement, the possibility that intense stimuli may create overstimulation for some users should not be ignored (Figure 1).

Figure 1 Rudolf Mine Bird's Eye View (Reference: Author Archive, 2025)



General spatial arrangements are of particular importance in this area to ensure the safety and comfort of all visitors, including child users. Accessibility is an important design problem, especially in NoBE buildings such as Salina Turda. The building has a modern panoramic elevator that facilitates access, but the reviews do not provide precise data on the extent to which this elevator and other spaces meet the accessibility standards for people with disabilities. In the field examination for observations and examinations, it is necessary to wait in line for more than five minutes to use the elevator in this very popular place.

- Theresa Mine: Its conical volume, reaching a depth of approximately 120 meters, presents a striking spatial void defined by an underground lake and a salt waterfall (Figure 2). The modern pier added for access to the lake surface allows visitors to take boat rides; thus, natural formations and recreational use come together in the same spatial setup (Ghiurco-Porumb, 2017). The natural water surface and vertical scale create a strong curiosity and discovery ground for the child user. However, depth perception, humidity, and limited light conditions bring sensory thresholds specific to the

underground space; It is seen that the experience carries positive/negative possibilities with different comfort levels for each user.

Figure 2 Theresa Mine View (Reference: Author Archive, 2025)



- The Registry Chamber: A transitional space that serves as a node in Salina Turda's internal circulation. It makes historical continuity visible with its location at the intersection of the entrance and exit flow to the Rudolf Mine. Visitors can reach the site via steps dating back to the 19th century and used by the last Grand Prince of Transylvania and Emperor Franz Josef of Austria.

"The Staircase of the Rich", located within the space, is described as the route that provided access to the Theresa and Rudolf mines before the shipping gallery was built. The parallel cavities on the wall surfaces reflect the marks formed by the hammer blows of the salt cutters; it carries the production history to spatial memory (Figure 3) (Salina Turda Eu, n.d.).

The transitional nature and the density of historical traces make the space an interface that has the potential to produce discovery and curiosity for the child user. However, narrow passages, cascading circulation, and hard surface textures create conditions that require attention in terms of safety and accessibility.

Figure 3 The Registry Chamber Area (Reference: Salina Turda Eu, n.d.)



• Ghizela Stationary Mine: After the Turda Salt Mine was opened to tourism in 1992, it turned into a treatment area called "stationary room" by combining two separate rooms. After this arrangement, the place becomes a treatment base where salt therapy and balneotherapy applications based on natural aerosols are performed, and is especially preferred by visitors with respiratory system disorders such as asthma and bronchitis (Ghiurco-Porumb, 2017). Within the space, there are areas where children can play and rest, and arrangements where parents can watch television or benefit from free internet access (Figure 4). In addition to rest periods, general gymnastics, breathing exercises, chess, games such as table tennis and snooker, and walking activities are applied in the programs within the scope of speleotherapy (Stănciulescu & Molnar, 2016). The treatment rooms have televisions, recreation units, and fitness equipment; a playground suitable for children's use is provided. It is stated that the microclimate offers high air purity free from irritants, and it is reported in the sources that speleotherapy is used as a complement to diseases such as asthma and bronchitis (Horowitz, 2010; Toma & Irimuş, 2013; Allahverdiyeva et al., 2023).

However, the fact that therapeutic arrangements are based on specific usage scenarios may limit the capacity of the space to produce open-ended play. It discusses the balance between the treatment-oriented program and free participation.

Figure 4 Crystal Hall Spa Treatment Room at Ghizela Stationary Mine (Reference: Salina Turda Eu, n.d.)



The sections added to the main volumes contain spatial elements that make the industrial heritage visible. In the "Crivac Room," the vertical transport machine dated 1881 is exhibited; The "Franz Josef Gallery" contains historical photographs and documents. In the Joseph Mine and "Extraction Shaft Chamber" areas, traces and demonstrations of old production practices are presented (Salina Turda Eu, n.d.).

With the opening of a historic salt mine for public use, the underground cavities have been remodeled with recreation, exhibition, and various event spaces. Natural formations, large volumes, vertical circulation elements, and thematic sections are included in the same spatial setup. The area exhibits a multi-layered usage structure. These features offer spatial qualities that coincide with the NoBE approach, which defines non-ordinary built environments.

Spatial Limitations

Salina Turda offers a closed ecosystem underground and produces psychosocial effects different from the upper-ground architecture. Lack of direct contact with the external environment can trigger feelings of isolation and entrapment (Sommer, 1974; Hollon et al., 1980). Lack of environmental stimuli and absence of natural light are associated with restlessness and claustrophobic reactions (Ringstad, 1994).

The windowless structure limits the perception of control over ventilation and light; It is associated with increased stress levels (Fich et al., 2014). Similar surface character and limited use of landmarks make it difficult to navigate; this may increase security concerns (Ringstad, 1994; Yokoi et al., 2015). The absence of natural vegetation is also stated as a factor limiting psychological well-being (Bringslimark et al., 2011).

Structurally, the risk of water leakage and collapse requires constant monitoring, and increased visitor density can lead to physical wear and loss of comfort (Kimic et al., 2021). There is data in the literature that the cultural connotations of the underground, which are associated with death and poverty, also feed the negative perception (Lesser, 1987; cited in Lee et al., 2017). In this context, the simultaneous existence of underground spatial limitations and therapy and recreation-based uses points to a two-way experience structure that requires the field to be considered within the scope of NoBE.

Spatial Features for Child Users

Salina Turda is designed as an underground theme park; A significant part of the recreational units is reserved for family and child use. Functions for children are concentrated in mini golf, bowling, table tennis, billiards, and various sports fields and special play units. Especially, the Rudolf Mine is positioned as the main recreation focus; It offers a spatial distribution that supports individual play and group interaction. Within the scope of the field study, the functional areas for the child user and the spatial approach related to these areas are presented systematically in Table 1.

Table 2 Visual Inventory of Spatial Arrangements for Child Use in Salina Turda (a, b, e, g Reference: Author Archive, 2025 c, d, f, h, I, j Reference: Salina Turda Eu, n.d.).

Function	Application	Figure
Playgrounds and Entertainment Facilities	Children Playground	 <p>a)</p>

Various Entertainment Activities	Mini golf  b)	Mini Bowling  c)
	Sports Area  d)	Panoromic Wheel  e)
	Table Tennis  f)	Billiards  g)
Rest and Relaxation Areas	 h)	
Amphitheatre	 i)	
Lake Ride		



J)

The sensitivities of the functions designed for children may vary in how design decisions are made. Although the play opportunities offered by Salina Turda to children are very impressive in terms of space, they are closed-ended, that is, scenario-based activities that can be used only for the production function in terms of the nature of the play. Imagination, spontaneous discovery, symbolic play, open-ended experience, and creative fictions, which are important components of play in the context of child development, are very limited in this environment. In this context, each element contains descriptive information about the spatial character of the current situation and provides a basis for understanding the child-oriented use potential of the area (Table 2).

Table 2 Functional Distribution of Spatial Facilities Offered to Child Users in Salina Turda (Reference: Author)

Function / Application	Regulation and Responsiveness
Playgrounds and Entertainment Facilities	Salina Turda, known as the underground theme park , has a children's playground.
Various Entertainment Activities	A variety of recreational activities are offered for children and families to enjoy: mini-golf, bowling, a sports field, a Ferris wheel, table tennis and billiards.
Rest and Relaxation Areas	In the treatment areas (in the Ghizela Mine) there are playgrounds for children to play comfortably, respiratory gymnastics, walking opportunities, board games, as well as armchairs and sofas where parents can relax.
Amphitheatre	There is a 180-seat amphitheater that hosts various events such as movies and concerts with the participation of children and families.
Lake Ride	The underground salt lake at the Terezia Mine allows tourists to take boat and paddle boat rides from the newly built pier.

In areas where play and healing space qualities intersect, the lighting effect of different intensities that reveal shadow plays, acoustic surfaces that reduce echo, and volumetric continuity are among the findings that increase children's exploration behaviors towards space. The layering and historical traces created by salt minerals along the surfaces offer an archaeological depth that stimulates children's sense of discovery and curiosity. These features have been observed as environmental cues that reinforce the association between the act of play and spatial memory (Figure 5).

Figure 5 Photographs for Amusement Parkland interior lighting (Reference: Author Archive, 2025)



The closed-ended nature of existing playgrounds limits children's creative, exploration-oriented, and multisensory participation. That shows that the multidimensional atmosphere of the space is insufficient to be carried to full capacity through play. However, it is seen that the space still offers important experiential contributions in the context of NoBE features. According to the NoBE approach, Salina Turda's contributions;

- **Sensory intensity:** The salt mine creates an intense sensory environment with its high mineral density, dark-light transitions, acoustic echo, and humidity balance. These sensory stimuli support children's play experience in a complementary way.
- **Spatial originality and scale:** High ceilings, conical spaces, and natural recesses and protrusions trigger curiosity and navigation perception in children. That makes even closed-ended plays more effective and remarkable.
- **Hybrid character:** The combination of artificial and natural formations offers an unusual spatial atmosphere. This situation shapes the way children interact with space and strengthens their healing space qualities.
- **Physical and Psychosocial Impact:** The venue's healing environment offers speleotherapy for respiratory illnesses, while the playgrounds ensure a safe and controlled experience. That contributes to both the physical and emotional recovery of children.

The site study shows that the underground context presents a strong atmospheric and volumetric character; however, it shows that playgrounds for children are not designed in an integrated manner with this character. It has been observed that the play units are largely constructed on standard typologies and do not establish a direct relationship with the vertical scale, natural surface texture, and light atmosphere offered by the underground structure. This situation causes the original shell of the space and the functions in the interior to work as two separate layers disconnected from each other.

The large volumes, mineral texture, and sensory density of the underground environment have a high potential for exploration for the child user. On the other hand, existing playgrounds do not develop spatial strategies that reveal this potential. Instead of an open-ended experience that interacts with environmental features, the play is reduced to a limited use case around specific props. Thus, the transformative effect of natural and non-ordinary spatial features on the level of participation and depth of experience cannot be reciprocated at the design level.

The findings show that children's first sensory responses to the underground atmosphere have a high potential to be strong; however, it reveals that playgrounds do not produce a fiction that perpetuates or directs this interaction. The spatial impact is largely limited to the environmental scale and atmosphere; play design does not become a tool that multiplies this effect. Therefore, the increased engagement, intensified exploratory behavior, and deepened experience predicted by the hypothesis remain at the level of potential in the current arrangement.

As a result, the findings show that non-ordinary spatial features alone are not enough; they show that if these features are not consciously integrated into the play setup, spatial authenticity cannot turn into experiential authenticity. It is seen that the underground context produces a strong environmental ground, but playgrounds cannot effectively utilize this ground.

CONCLUSION

The case of Salina Turda presents a multi-layered spatial order that brings together the geological formations of the underground scale and contemporary interventions. The preservation of industrial heritage and its re-functioning with recreational, cultural, and therapeutic functions transforms the underground environment into an experience-oriented structure. When evaluated from the perspective of the child user, sensory intensity, volumetric size, and spatial differentiation produce a strong potential. Scale, acoustics, mineral texture, and microclimate characteristics create a unique backdrop that can support exploration-based play behavior.

However, the fact that a significant part of the existing playgrounds are built on mini-golf, bowling, or similar closed-ended indoor plays establishes a limited relationship with the natural and historical opportunities offered by the underground context. That shows that spatial authenticity is not fully reflected in the playing experience. When the geological layers of the subsurface structure, salt minerals, the echo effect, and microclimate conditions are not essential components of the playing are design, the experience remains largely visual and atmospheric.

The main hypothesis of the research is that play environments with natural and unusual spatial features will increase children's level of participation, exploratory behavior, and depth of experience. In the case of Salina Turda, it is observed that sensory intensity and spatial authenticity strengthen children's first interaction with space. However, the current closed-ended play setup limits creative and open-ended participation; It prevents natural elements from turning into play raw materials. Therefore, the basic assumption of the hypothesis is supported at the potential level, but this potential is not fully revealed due to design decisions.

In order to construct children's playgrounds more effectively in the underground context, the design must be integrated with the natural shell, volumetric scale, and environmental features. Playgrounds make elements such as light, humidity, acoustic, and mineral texture a part of the experience, integrating vertical and horizontal scale relationships into motion and exploration scenarios. It must deal with recreation and therapeutic functions in spatial continuity. Open-ended play areas, gradual sensory zoning, flexible and reconfigurable units, and the incorporation of historical narrative routes into the design are considered tangible strategies that deepen the experience. In particular, the transformation of salt surfaces, echo effect, and microclimatic conditions into interactive and educational play components offers an approach that is compatible with the unique character of the underground space.

The methodological framework of the study is based on qualitative observations and spatial analyses. The observations were conducted by the author at specific intervals. That limits the generalizability of some conclusions and results in assessments that are, to a certain extent, interpretive. In future research, the combined use of methods such as behavior mapping, usage intensity analyses, time-space tracking studies, and user interviews, as well as the addition of physiological and sensory

measurements, will contribute to a more objective understanding of the relationship between natural microclimate and play behavior.

As a result, Salina Turda has the potential to establish a strong link between child and play-based approaches and the concept of healing space within the scope of NoBE. However, the lack of holistic integration of natural and historical elements into play design limits the depth of experience. In underground spaces, the play is based on nature, materials, and geological features instead of standard hall plays; it has the capacity to produce a multi-layered experience that both strengthens heritage awareness and supports exploration and creativity. This approach makes a theoretical and practical contribution in terms of developing child-centered design principles in non-ordinary building environments and expanding the understanding of healing spaces.

AI Disclosure Statement

Artificial intelligence (AI) tools were used in the preparation of this manuscript solely for basic grammar correction, language refinement, and facilitating the reading and organization of reference materials. Specifically, OpenAI's ChatGPT and Grammarly were utilized to enhance the readability and linguistic clarity of the English text. At the same time, NotebookLM was employed ethically to aid in reviewing and summarizing source materials. The author independently developed all scientific content, data analyses, interpretations, and conclusions. The author has carefully reviewed all AI-assisted outputs for accuracy and assumes full academic responsibility for the content of the manuscript.

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