Keypoints and Influencing Factors of Biophilic Interior Architecture and Design in the Romanian Pre-School Educational System

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Abstract

Considering the development of small children education in a highly creative and dynamic world, this article aims to unveil the benefits of child-friendly design and architecture in the Educational System world of Kindergartens in Romania, Timis County. Starting with theoretical information regarding biophilic design, ergonomic design, color theory, gamification and learning through play with the help of design, the study analyzes best practices to extract a set of guidelines adequate to the public Romanian educational system. Interior architecture in educational spaces, particularly kindergartens in Romania, plays a crucial role in shaping children's cognitive, emotional, and social development. This study explores the key points and influencing factors that define effective interior design in early childhood education environments; the integration of interactive and flexible spaces enhances creativity and adaptability in educational activities. By analyzing these elements, through the following methodologies: empirical observations, site visits, discussions with children(teachers, parents and others), the research highlights best practices and innovative solutions for optimizing pre-school interiors; ultimately supporting a comprehensive(holistic) and engaging educational experience; from studied examples around the world and especially European Union, case studies from Timis County and attentievly selected activities specially curated for small children, were we will test their attention span through design and architecture; the aim is to discover how to better design such crucial spaces for our childrens future education.

Keywords: small childrens education, biophilic design, ergonomic design, learning atmosphere, educational activities, shaping children's, creative world of children, influence of design

1. Introduction and History

In an era defined by rapid technological advancement and an ever-evolving understanding of childhood development, the foundation laid in early education is crucial. Within this context, the design and architecture of learning environments play a crucial, yet often overlooked, role in fostering creativity and dynamism in young learners. This article delves into the transformative potential of child-friendly design and architecture within the Romanian kindergarten system, specifically focusing on Timis County. By synthesizing theoretical frameworks encompassing biophilic design, ergonomic principles, color theory, gamification, and the power of learning through play, we aim to illuminate how thoughtful spatial design can significantly enhance the educational experience. Ultimately, this study seeks to extract actionable guidelines, tailored to the unique context of the Romanian public educational system, to create enriching and stimulating environments where young minds can flourish. The pre-school era is the last stage of the child's educational life were he can be fully creative and explore without mind boundaries.

Imagine stepping into a world designed just for little explorers, a place where learning feels like a magical adventure. That's the power of great kindergarten design! In a world that's always changing, how we create spaces for our youngest learners really matters. This article takes a peek into kindergartens in Timis County, Romania, to see how smart design – using things like nature, comfy furniture, fun colors, and play – can make a big difference. We'll look at cool ideas from around the world, talk to kids, teachers, and parents, and even try out some fun activities to see what works best. The goal? To figure out how to build amazing kindergartens where children can grow, learn, and thrive, setting them up for a bright future.

Imagine a time when kids weren't really encouraged to play and learn! That changed thanks to a thoughtful German educator named Friedrich Froebel. Back in 1837, he opened the very first kindergarten. He believed children learned best through play, music, and exploring nature – a pretty radical idea back then! He even got kids learning together in groups. Even though some people tried to stop him, his idea spread like wildfire around the world.(fig.1)

Then, the kindergarten idea crossed the ocean to the United States. Margarethe Schurz started the first one in 1856, and then Elizabeth Peabody made it accessible in English. Charities stepped in to help immigrant families, creating kindergartens that focused on helping kids grow in all sorts of ways. Saint Louis was the first city to make kindergarten part of the public school system in 1873, and by the start of World War I, most big cities followed suit. It took a while, but eventually, even Mississippi joined in, making kindergarten available to everyone by 1986. Now, kindergarten is a common part of school life, though the rules about going are a little different from state to state.

In the mid-19th century, the first kindergarten in Romania was opened in the town of Jibou in Transylvania. It was created specifically for the children of peasants who worked on the estate of the Hungarian baron Miklós Wesselényi.

Fig. 1. Froebl – first Kindergarten, Generated using [6]

At that time, it was common for rural children to be used for agricultural work. However, a Hungarian nobleman with modern ideas wanted to show parents how important education is. To convince them, he opened a kindergarten. Here, parents brought their children, whom they could not use for work due to their young age. Thus, they were more willing to leave them in the care of educators.

This initiative belonged to Baron Miklós Wesselényi (1796 – 1850). He himself received a refined education, studying foreign languages, history, philosophy and law. After finishing his studies, he traveled through Europe to see how the economy works in other countries. When he returned to Jibou, he tried to apply what he had learned.

This is how Wesselényi came to promote early education, through the establishment of kindergartens. Because they were young, children could not work in the fields, so parents left them more easily in kindergarten. In addition, they also got rid of their care. The first kindergarten he built was right on his estate in Jibou, being the first of its kind in Transylvania and, probably, in the whole country [1-3].

Fig. 2. "Traumbaum' Kindergarten Berlin, Generated using [6]

2. Research Methodology

The research employs a multi-faceted approach to investigate the impact of interior design on kindergarten environments in Romania. The methodology focuses on understanding how spatial arrangements influence children's cognitive, emotional, and social development. To begin, studies are conducted with empirical observations and site visits to various kindergartens within Timis County, this allowed to gather firsthand data on the existing design elements and how these spaces were utilized.

Furthermore, engaged in discussions with key stakeholders, including children, teachers, and parents,these conversations provided valuable qualitative insights into the users' experiences and perceptions of the learning environments. Research also includes the analysis of case studies from around the world, particularly within the European Union. This comparative approach enabled the identification of best practices and innovative solutions in kindergarten design. Finally, the designed and implemented carefully selected activities for small children. These activities were used to test how different design and architectural elements affected the children's attention spans. This practical application allowed for direct observation of the impact of spatial design. By combining observational, conversational, and experimental methods, aiming to develop a comprehensive understanding of how to optimize kindergarten interior design to support children's educational experiences.

The educational system of Romania is influenced by a variety of factors, including: historical, social, economic, political aspects, architectural and design aspects. A key influential point in the educational system would be the historical aspect, especially communist influence which ended with the Romanian Revolution in December 1989, still affects parts of the education system of today ; but what comes as a plus and a general positive influence, is the EU integration of Romania, on January 1st 2007, which has influenced its educational policies and practices, especially in aligning Romania with EU standards and promoting mobility within the EU for pupils/students and educators, with well known programs such as Erasmus.

As for socio-economic aspects, efforts are made to ensure access to education for all children in Romania, but discrepancies exist between urban and rural areas, as well as among different socio-economic groups, for example minorities, people who still suffer from poverty and do not have easy access to education. Economic conditions influence educational resources, infrastructure, and the availability of extracurricular activities ; the economic discrepancies can affect the quality of education and educational outcomes, but also general life

outcomes, especially in the rural parts of Romania.

The political factor is a key point on how the whole educational system operates in Romania, from how it is structured : Romanian educational system is structured into several levels, including preschool education, primary education; to how it functions and how the curricula is teached, this whole system is fully based on the laws and rules set by the Ministry of Education and Research. These laws within the Ministry of Education dictate curriculum, educational standards, teacher qualifications, administrative procedures such as the architecture and interior architecture quality of the building, in collaboration with other relevant authorities and local authorities were these public institutions are build, here we refer to rural or urban areas, also depending on the local budget and administration. This therefore means a minimal but important aspect is set as ground rules on how to build and operate in the building or future building of a preschool/primary school, such as safety of the children/educators, good structural integrity, access for people with disabilities, enviromental considerations, good lighting : natural and artificial, a good quality functional scheme,which implies well thought classrooms, indoor and outdoor recreational spaces of common use(playgrounds) but also for physical education which will all in all improve and grow the whole quality of the Educationl System.

The aim of this article is to synthesize and correlate social, educational and architectural changes and evolution in the recent years of the Educational System in Romania through different research methods ilustrating new conclusions to the current situation [3, 4].

2.1 Case Studies

Studied examples and situations show the real and raw condition in which our children are learning today, with major differences between rural and urban areas in Timis County Romania, both including positive, but also negative aspects regarding biophilic design, ergonomy of the spaces, but most importantly the furniture the children use on a daily basis and the unhappy colour chromatics in which they interact throught the day.

First study comes from rural area Izvin in contrast with Sustra, both close rural areas in Timis County, were the situation is very much similar regarding biophilic-ergonomic design and so on.

As seen in the image above (fig. 3.) the rural Izvin pre-school is missing certain beneficial aspects for the childrens day by day education and play: insufficient natural lighting followed by improper artificial lighting, the rooms look too dark and gloomy, insufficient storage space for toys – learning materials but also improper storage space locker vise for the childrens changing space, in this situation the furniture ergonomy could be better thought of and as biophilical matters we could have bigger windows in this situation, which will require just minimal interventions that could be very beneficial for the childrens education and learning through play in a very fast paced and technological environment.

Fig. 3. Rural Izvin pre-school Timis County, source:own images

As seen in the image above (fig. 4.) the rural Sustra pre-school is missing certain beneficial aspects for the childrens day by day education and play: improper artificial lighting although the natural lighting is much better than in the previous example, the rooms look too dark and gloomy because of the colour scheme picked in this environment, colours should be warmer lighter tones close to the natural ones so they can capture better the lighting, insufficient storage space for toys – learning materials but also improper storage space locker vise for the childrens changing space, in this situation the furniture ergonomy could be better thought of and as biophilical matters we could have bigger windows in this situation, better colour schemes more pastels and closer to the natural and pure colours, to be avoided dark grey tones and dark in general, which will require just minimal interventions that could be very beneficial for the childrens education and learning through play in a very fast paced and technological environment.

Fig. 4. Rural Sustra pre-school Timis County, source:own images

As seen in the image above (fig. 5.) the rural Ghiroda pre-school is a totally different situation as the two examples above from Sustra and Izvin, with generous windows sets but also a good artificial lighting that imitates the light of day as for the children not to feel the absence of the sun and natural lighting during fall and winter, which helps them focus more on their day to day play and activities. This will lead them to much more joyfull days and much more active mindsets. As we can see in the images above regarding ergonomics of the space, the classroom has very generous space a high ceiling plan, furniture properly fitted for children of all groups and ages, more than enough storage spaces for: teachers and their materials, but most importantly proper fitted for the childrens needs. This is also a good example for colour schematics, using light tones with pastel colours, these colours mostly remind children of something sweet, as candy, which is why it is so appreciated by them. [4]

Fig. 5. Rural Ghiroda pre-school Timis County, source:own images

As seen in the image above (fig. 6.) the kindergarten, built in 1990 on a radial floor plan, was to be modernized, especially brightening the dark corridors of the two-story building and making them more experiential. With the renovation measures, the Baupiloten are redefining

the long and dark corridors on the ground floor of the kindergarten as a cross-group community area. Right at the entrance, visitors are greeted and welcomed in the 14 languages of the children. A bright and friendly colour scheme enhances the corridor areas, as do the light-directing elements on the ceiling, which reflect natural light from the atrium into the corridors depending on the time of day and year. New slanted plasterboard walls create a feeling of security and, with textile, luminous seating elements, offer a wide variety of shelter and retreat options for the children. The constantly changing light and spatial impressions stimulate the children's imagination to communicate beyond their language barriers.".[5]. Although the built environment above was built in 1990, still serves today as a very good example of pre-school design, especially in the matters of biophilic and ergonomic design. This could be easily integrated into nowadays kindergartens in Timis County Romania, but not only.

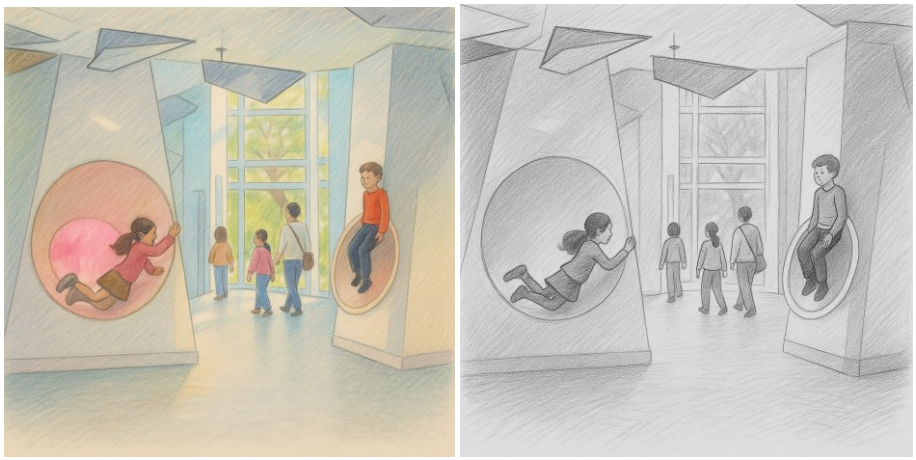

Fig. 6. “Traumbaum’ Kindergarten Berlin, Generated using [6]

3. Results and Discussions

Rural pre-schools offer a unique chance to connect young children with nature. Their cozy, smaller settings can be ideal for biophilic design, which brings natural elements indoors. Imagine classrooms with natural light, wooden features, and views of the surrounding landscape. This approach can create calming and stimulating environments that promote learning and well-being.

However, rural pre-schools often face challenges. Limited budgets can make it difficult to incorporate biophilic elements, and older buildings might need significant renovations. Access to modern resources, like educational technology, can also be restricted. Additionally, rural areas may struggle to attract and retain qualified early childhood educators.

Despite these hurdles, the opportunities are immense. By focusing on simple, sustainable biophilic designs, rural pre-schools can become inspiring places for children. Using natural materials, maximizing daylight, and creating indoor plant areas can be achieved with thoughtful planning and community involvement. Collaborations with local artisans and businesses can provide unique, nature-inspired resources.

Ultimately, integrating biophilic design into rural pre-schools is about nurturing a strong connection with nature from an early age. It's about creating spaces where children can learn, grow, and thrive in harmony with their natural surroundings, even with the limitations that some rural areas may have.

Urban pre-schools face a unique challenge: bringing the calming influence of nature into densely populated environments. Biophilic design, with its emphasis on natural light, greenery, and natural materials, offers a powerful solution. Imagine city pre-schools with rooftop gardens, indoor vertical plant walls, and classrooms bathed in natural light filtering through large windows. These spaces can provide a crucial connection to nature for children often surrounded by concrete and steel.

However, implementing biophilic design in urban settings comes with its own set of hurdles. High land costs and limited space can make it challenging to incorporate natural elements. Existing buildings may require extensive and costly renovations to maximize natural light and airflow. Noise and air pollution can also be significant concerns, requiring careful design considerations. Additionally, urban pre-schools may face challenges in attracting and retaining qualified staff in competitive job markets.

Despite these obstacles, the opportunities are vast. By creatively integrating biophilic elements, urban pre-schools can create enriching and restorative spaces. Utilizing vertical spaces for greenery, incorporating natural materials like wood and stone, and maximizing natural light through skylights and large windows can transform even small spaces. Collaborations with local urban gardens, parks, and environmental organizations can provide valuable resources and educational opportunities.

Ultimately, biophilic design in urban pre-schools is about creating a sanctuary of nature within the city. It's about providing children with vital connections to the natural world, even in the midst of a bustling metropolis, fostering their well-being and development. [6, 7]

4. Conclusions

Key Influential Direction for Continued Study:

A crucial direction for ensuring the continuity of this study is to conduct more focused and individualized research in specific areas within Timiș County. This should involve comparing the contrasts between different geographical rural and urban areas within Romania. For example, examining the rural differences in the Educational System in Dobrogea compared to Transylvania or Moldova.

Specific Areas of Focus:Studies of rural and urban areas.Focus on the needs of children, educators, and parents.Utilizing interviews.Employing questionnaires.Exploring the potential of working with Artificial Intelligence (AI).

Interpretation and Potential Implications: This suggests a need for deeper, more localized research into the factors affecting education and child development in Romania, with a specific focus on the differences between rural and urban settings. The suggested methodologies (interviews, questionnaires, and potentially AI) indicate a desire for a comprehensive and data-driven approach. The mention of specific regions (Dobrogea, Transylvania, Moldova) implies that regional differences are significant and warrant further investigation. [6, 7]

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