ПЛАТФОРМА 5
ПЕРСПЕКТИВИ РОЗВИТКУ ДИЗАЙНУ АРХІТЕКТУРНОГО СЕРЕДОВИЩА

DESIGN OF CHILDREN'S PLAYGROUNDS: CREATING SENSORY AND EXPERIENTIAL SPACES

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The design of children's playgrounds is evolving towards more nature-integrated, sensory-rich environments that encourage exploration, creativity, and physical engagement. This paper examines contemporary approaches to designing outdoor play spaces that incorporate natural materials, interactive water elements, and kinetic play structures. By analyzing real-world examples from Switzerland, Germany, and China, including rope-based climbing structures, wooden play elements, and water-driven kinetic installations, this study identifies key strategies that enhance children's sensory experiences and foster cognitive and physical development. The findings emphasize the importance of integrating nature-based and hands-on learning activities into playground design to create more engaging, educational, and sustainable play environments.

Key words: *natural playgrounds, children's play environment, interactive design, sensory play, water play, kinetic installations, experiential learning.*

INTRODUCTION

Traditional urban playgrounds often rely on prefabricated equipment that provides limited engagement beyond physical activity. However, recent trends in playground design focus on integrating natural elements, interactive water features, and kinetic installations to enhance children's sensory and exploratory experiences. These nature-based playgrounds offer opportunities for multi-sensory engagement, fostering cognitive development, social interaction, and environmental awareness. This paper explores innovative approaches in playground design that emphasize natural materials, water-based play, and kinetic interactive elements, analyzing their impact on child development and user engagement.

PURPOSE

This study aims to analyze contemporary trends in the integration of natural materials and interactive features into playground design, examine the impact of water play and kinetic elements on children's sensory and cognitive development, and present case studies of nature-based playgrounds in Switzerland, Germany, and China that successfully implement these concepts.

RESULTS AND DISCUSSION

The following section presents key principles of contemporary playground design, focusing on the integration of natural materials, interactive water elements, and kinetic structures. These principles reflect current trends in child-friendly urban planning and highlight strategies that improve sensory engagement, cognitive development, and social interaction in outdoor play environments.

1. Integration of Natural Materials in Playground Design

Modern playgrounds increasingly utilize wood, stone, sand, and natural rope to create engaging and eco-friendly environments. Wooden climbing structures, such as those found in the Mainau Island playground (Germany) and traditional playgrounds in China's rural landscapes, promote imaginative play and encourage children to develop motor skills through unstructured exploration. The use of untreated timber and natural textures enhances tactile engagement, making play spaces more inviting and harmonious with their surroundings.

2. Interactive Water Play as a Sensory and Educational Tool

Water-based play elements, such as wooden water channels, waterwheels, and Archimedean screws, provide dynamic experiences that teach children about cause and effect, water flow mechanics, and natural energy transfer. The water play area at Rothaus Brewery in Grafenhausen, Germany (Fig. 1), features wooden sluices and wheels that allow children to manipulate water flow, fostering hands-on learning and cooperative play. Similarly, the Glacier Corridor in Cloud Paradise (China) incorporates an interactive soundscape where water-droplet sounds are triggered as children pass through, creating an immersive sensory experience that simulates a melting glacier environment.

Additionally, the Dry Spray Plaza in Cloud Paradise (Fig. 4) features a dynamic water play area where children activate fountains through movement, fostering interaction and engagement. The playful design encourages spontaneous collaboration, as children experiment with cause-and-effect relationships by triggering different water jets and spray patterns.

Fig. 1. The water play area at Rothaus Brewery in Grafenhausen, Germany (Photograph by the author)

3. Kinetic and Climbing Play Structures for Physical and Cognitive Development.

Kinetic play elements, such as rope-based climbing structures and interactive movement features, offer children an opportunity to engage in risk-

assessed physical challenges that improve balance, coordination, and problem-solving skills. The giant spider web climbing net in Zurich, Switzerland, exemplifies how organic forms and interactive movement simulate real-world climbing experiences while enhancing spatial awareness (Fig 2).

In Cloud Paradise (China), a unique play installation features motion-activated components that respond to children's movement, creating an evolving visual and auditory experience. This interactive design fosters active engagement by combining physical play with responsive digital elements, demonstrating a fusion of traditional nature play and modern technology.

Fig. 2. The giant spider web climbing net in Zurich, Switzerland (Photograph by the author)

4. Designing Playgrounds as Experiential Learning Spaces

By integrating natural, interactive, and kinetic elements, playgrounds become multi-dimensional learning environments that stimulate creativity and critical thinking. These spaces provide hands-on, open-ended play, allowing children to develop problem-solving skills, environmental awareness, and social interaction abilities. The use of eco-conscious materials further enhances sustainability, ensuring that playgrounds align with modern urban planning principles that prioritize green spaces. The Dalierhai Ecological Corridor in China (Fig. 3) exemplifies how contemporary playground design can merge nature and education. Featuring sensory-based installations and interactive water features, this project emphasizes ecological learning by encouraging children to explore their surroundings through physical movement and multi-sensory engagement

Fig.3. Aerial view of children's activity space in Dalierhai Ecological Corridor, China [1]

Fig.4. The dry spray Square. Cloud Paradise in Chengdu, China [1]

CONCLUSIONS

The study highlights the growing importance of nature-based and interactive elements in playground design, demonstrating their ability to enhance sensory experiences, cognitive development, and environmental awareness. Successful case studies from Switzerland, Germany, and China illustrate how water play, kinetic elements, and climbing structures can transform playgrounds into dynamic, experiential learning spaces. Future research should explore the long-term impact of such designs on children's psychological and motor development, as well as the potential for integrating digital interactive elements into natural play environments.

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ДИЗАЙН ДИТЯЧИХ ІГРОВИХ МАЙДАНЧИКІВ: СТВОРЕННЯ СЕНСОРНИХ І ДОСЛІДНИЦЬКИХ ПРОСТОРІВ

Дизайн дитячих ігрових майданчиків еволюціонує в бік більш природньо інтегрованих, сенсорно насичених середовищ, що заохочують дослідження, творчість і фізичну активність дітей. У цій роботі розглядаються сучасні підходи до проектування відкритих ігрових просторів, які включають природні матеріали, інтерактивні водні елементи та кінетичні ігрові конструкції. Аналізуючи реальні приклади зі Швейцарії, Німеччини та Китаю, зокрема мотузкові конструкції, дерев'яні ігрові елементи та водно-рухові інсталяції, дослідження визначає ключові стратегії, що покращують сенсорний досвід дітей та сприяють їхньому когнітивному та фізичному розвитку. Результати підкреслюють важливість інтеграції природно-орієнтованих і практичних навчальних активностей у дизайн ігрових майданчиків для створення більш захоплюючих, освітніх та сталих ігрових середовищ.

Ключові слова: *природні ігрові майданчики, дитяче ігрове середовище, інтерактивний дизайн, сенсорні ігри, водні ігри, кінетичні інсталяції, дослідницький досвід.*