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PLAYFUL DESIGN ELEMENTS IN KINDERGARTEN WAYFINDING SYSTEM: STIMULATION OF EMOTIONS AND INTERACTION

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This study explores the role of playful design elements in kindergarten wayfinding systems through a case study of multiple world regional kindergartens. Groups of such elements were identified and methods for forming their figurative solutions were outlined. It was found that playful design not only improves children's spatial cognition, but also turns signs into interactive learning tools that form emotional connections. The work presents a new perspective on the visual design of the kindergarten environment, aimed at improving children's learning experience and their emotional development.

Key words: *Kindergarten Sign Systems; Playful Design; Emotional Interaction; Spatial Cognition.*

INTRODUCTION

The signage system in kindergartens plays a dual role in children's daily activities: first as a spatial navigation tool to help children understand environmental layouts, and second as a medium for emotional and cognitive development. Current kindergarten wayfinding systems predominantly focus on functionality while lacking in-depth consideration of children's psychological needs. Particularly, research remains limited regarding how to enhance children's sense of belonging through playful design or transform signage systems into educational resources. This study aims to address this research gap by identifying interesting elements of playful design in kindergarten sign systems and their impact on child development.

PURPOSE

The purpose of this study is to systematic analyse the playful design elements in kindergarten wayfinding systems. Based on case studies, the research aims to provide theoretical references for optimizing kindergarten environments, advancing the innovation and practice of child-friendly space design.

RESULTS AND DISCUSSION

In kindergarten environments, children's daily activities are highly dependent on intuitive wayfinding systems. These designs translate complex spatial information into child-comprehensible visual symbols through graphics, colours, and

other visual languages, covering all scenarios from classrooms to play areas and administrative offices, thereby becoming an indispensable component of the kindergarten setting.

Visual engagement in children's wayfinding systems achieves dual objectives via symbolic cognitive mapping and environmental narrative construction: functioning both as physical spatial markers and interactive interfaces for cognitive development. Empirical studies by Rousek et al. demonstrate that signage systems characterized by highly stylized forms and decorative graphical coherence significantly enhance recognizability [1]. Concurrently, Guo's research reveals that the symbolic integration of artistic motifs and iconographic elements within directional signage systems achieves dual optimization – elevating cognitive efficiency while enabling synergistic enhancement of aesthetic value [2]. This design strategy balances form simplification with feature amplification, preserving the recognizability of natural motifs while fulfilling children's cognitive needs for symbolic information. The result is an "environment-symbol-cognition" triadic interaction model that bridges spatial awareness, symbolic interpretation, and developmental outcomes. For example, Noji Conservation Park in Tokyo, Japan (Tabl.1:1), utilizes a combination of coloured acrylic discs to achieve dynamic colour changes, while Miyomori Kindergarten in Miyagi Prefecture (Tabl.1:2) integrates three-dimensional geometric shapes and planar graphics to represent different themes. In China, A Forest Children's Museum in Chengdu (Tabl.1:3) and Luhu Community Cloud Kindergarten (Tabl.1:4) stylize natural forms into signage.

Emotional connection plays a central role in children's wayfinding system design by enabling psychological adaptation and identity anchoring. By transforming environmental signage into emotionally interactive media, such designs not only alleviate children's anxiety in unfamiliar spaces but also cultivate their sense of belonging through sustained symbolic engagement, ultimately achieving a psychological shift from "physical space" to "emotional territory." Empirical research by Giraldi et al. demonstrates a direct correlation between graphic design elements in children's environments and experiential quality. Specifically, higher congruence of visual elements with children's cognitive schemata significantly reduces perceived environmental stress and facilitates positive emotional responses [3]. This further validates the mechanism whereby "emotionally charged signage converts spatial stress into exploratory motivation through empathetic resonance." For instance, Shenzhen Second Kindergarten (Tabl.1:5) and Yusao Kindergarten in Narita, Japan (Tabl.1:6), use stylized animal figures for navigation. The children's section of Hyundai Seoul Department Store (Tabl.1:7) in South Korea and the Economic Development Zone Kindergarten in China (Tabl.1:8) employ anthropomorphic design to imbue inanimate objects with emotional characteristics. This approach not only improves navigation efficiency and meets the functional needs of guiding children through the kindergarten but also cultivates their curiosity and exploratory instincts, which are crucial for their cognitive and emotional development.

Embedded education can be characterized as a situation-neutral induction process through which complex environmental stimulus information is acquired,

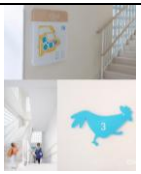
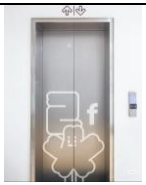
predominantly independent of subjects' metacognitive awareness regarding either the knowledge acquisition mechanism or the tacit knowledge base ultimately consolidated [4]. This paradigm achieves unconscious knowledge assimilation by seamlessly integrating learning modalities into spatial environments, enabling children to internalize navigational and spatial schemas through natural exploratory behaviors (e.g., wayfinding, landmark interaction) without explicit instructional scaffolding. Its core value lies in transcending traditional educational boundaries, transforming wayfinding systems into open-ended pedagogical tools – children simultaneously complete cognitive tasks while navigating paths and reinforce muscle memory through physical interaction, thereby establishing a "environment-embedded learning" hybrid developmental model. For example, Valley Four Seasons Hongfan Kindergarten (Tabl.1:9) transforms children's drawings into signage. This participatory design strategy stimulates children's learning interest and enhances their sense of environmental belonging. Meanwhile, Yusao Kindergarten (Tabl.1:10) incorporates three-dimensional designs of everyday elements for children's play and entertainment. These cases demonstrate that when wayfinding systems transcend traditional information delivery and shift toward an "explore – discover – learn" experiential loop, they simultaneously promote the synergistic development of spatial cognition, emotional security, and knowledge construction.

In summary, playful design elements have a positive impact on children's spatial cognition, emotional development, and educational experiences. A kindergarten wayfinding system that integrates visual appeal, emotional connection, and embedded learning can enhance children's spatial cognition efficiency and shorten their environmental adaptation period. By incorporating dynamic signage, anthropomorphic symbols, and child co-creation, traditional wayfinding systems are transformed into a tri-functional tool that integrates cognition, emotion, and education.

Table 1

Groups of Design Elements in Kindergarten Sign Systems: imaginative solutions

Groups of Elements	Samples of visual signs	Ways of image formation	Functional characteristics
Abstract figures	 1  2 1– Noji Conservation Park, Tokyo, 2021; 2 – Miyomori Kindergarten, Miyagi Prefecture, 2021	Combining thematic images from flat and three-dimensional abstract shapes and geometric elements	

Natural elements	 3  4 3 – A forest children's museum, Chengdu, 2023; 4 – Luhu Community Cloud Kindergarten, Chengdu, 2023	Stylization of natural forms and their transformation into signs	Visual attraction
Animal elements	 5  6 5 – Shenzhen second Kindergarten, Shenzheng, 2021; 6–Yusao Kindergarten, Narita City, 2023	Stylization of animal figures and their use for navigation	Emotional contact
Anthropomorphic elements	 7  8 7–Hyundai Seoul Department Store Children's Department,Seoul,2021; 8 – Economic Development Zone kindergarten, Pinghu, 2022	Bringing artificial elements to life by expressing emotions	
Children's hand-drawn elements	  9 Valley four seasons Hongfan Kindergarten,Chongqing, 2024	Converting children's drawings into graphic iconic forms	Embedded education
General conceptual elements	 10 Yusao Kindergarten, Narita City, 2023	Installation as a three-dimensional sign form	

CONCLUSIONS

This study, through cross-cultural case analyses, reveals the multidimensional value of playful design elements in kindergarten wayfinding systems. Findings demonstrate that the tripartite synergy of visual engagement, emotional connectivity, and pedagogical integration effectively transforms conventional signage into a composite medium that simultaneously promotes cognitive development, emotional attachment, and social growth. Such integration achieves functional efficacy while preserving playful interactivity. Furthermore, co-created design paradigms establish foundational support for children's psychological well-being and social skill development through participatory spatial experiences.

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ЕЛЕМЕНТИ ІГРОВОГО ДИЗАЙНУ У НАВІГАЦІЙНИХ СИСТЕМАХ КИТАЙСЬКОГО ДИТЯЧОГО САДКА: СТИМУЛЮВАННЯ ЕМОЦІЙ ТА ВЗАЄМОДІЇ

У роботі розкрито роль елементів ігрового дизайну в навігаційних системах дитячих садків на прикладі регіональних закладів різних країн. Були визначені групи таких елементів та описані методи створення їхніх образних рішень. Встановлено, що ігровий дизайн не лише покращує просторову когнітивність дітей, а й перетворює навігаційні знаки на інтерактивні навчальні інструменти, що формують емоційний зв'язок. Робота пропонує новий погляд на візуальне оформлення середовища дитячого садка, спрямований на покращення навчального досвіду та емоційного розвитку дітей.

Ключові слова: *навігаційні системи дитячих садків; ігровий дизайн; емоційна взаємодія; просторова когнітивність.*