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ASPECTS OF DESIGNING AN INCLUSIVE ORIENTATION SYSTEM FOR CHILDREN WITH SPECIAL NEEDS

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The article examines the design features of wayfinding system that supports children with special needs in child-friendly public environments. Based on the analysis of representative cases, theoretical design considerations such as cognitive readability, emotional experience, and visual interpretation are identified. It is demonstrated that effective multi-level signaling systems rely on clear and consistent cues that are easy to recognize and confirm along the route, which helps reduce uncertainty and stress during movement. These findings are combined into a compact set of design considerations for improving child-friendly orientation practices.

Key words: *visual communication design; inclusive wayfinding; signage system; children with special needs; emotional experience; navigation system.*

INTRODUCTION

Wayfinding systems in child-friendly public environments do more than guide movement. They also shape how children experience a place, including their sense of safety and control. Many existing systems are still designed around adult-oriented information processing and interaction patterns. As a result, directional efficiency is often prioritized over children's need for clear information hierarchy and repeated confirmation along the route. In child-focused settings, this mismatch becomes more visible: dense information, weak cues at decision points, and high visual noise disrupt both wayfinding continuity and environmental predictability. For children with special needs, such uncertainty often develops into anxiety and avoidance, which limits independent movement and participation in space. This paper therefore focuses on inclusive wayfinding system design and examines how system-level organization supports both wayfinding ability and emotional experience for children with special needs.

PURPOSE

This study identifies and synthesizes key inclusive design aspects in wayfinding systems for children with special needs through case-based analysis. It examines how these design aspects support wayfinding ability and emotional experience, and provides design references for improving child-friendly public environments.

RESULTS AND DISCUSSION

In child-friendly public environments, wayfinding is not a one-time act of "reading and arriving," but a continuous process of understanding and confirmation. As children move, they rely on continuous cues and environmental feedback to maintain direction and predictability, but this process is more likely to break down at decision points for children with special needs. When cues are discontinuous, information hierarchies are dense, visual noise is high, or signs are not intuitive, disorientation quickly escalates into anxiety, avoidance, or freezing. The key issue in inclusive wayfinding is therefore not the amount of information provided, but how effectively the system reduces interpretation burden and uncertainty. With this in mind, the following discussion focuses on actionable design aspects and representative cases to explain how inclusive wayfinding supports both navigation and emotional experience.

The first design aspect of inclusive wayfinding is cognitive legibility. From this perspective, inclusive wayfinding reduces the interpretive burden children with special needs face while moving through space. Rather than requiring them to re-figure out the route at every node, effective systems provide stable, verifiable cues: consistent sign rules across zones, floors, and functions, reinforced by layered visual cues (e.g., color, pictograms, and numbering) to improve recognition. Recent hospital-wayfinding research describes navigation as a continuous decision-making process and shows that signage alone is often insufficient for users with diverse needs [3]. More effective systems provide successive cues and confirmable sequences at decision points. From a design perspective, expectations such as ease of use and reduced disorientation are closely related to clarity, standardization, and legibility. In pediatric settings, a common design approach is thematic zoning, with consistent visual logic applied across wall graphics, hanging signs, door identifiers, and floor guidance. The Royal Children's Hospital Melbourne is a useful example (Fig. 1:a): level themes, graphic language, color, and floor patterns work together to support orientation and continuous confirmation, helping translate a complex layout into cues that children can more easily follow.

a b c

Fig. 1. Examples of visual communication in pediatric healthcare environments: a – The Royal Children's Hospital Melbourne; b – Sant Joan de Déu Children's Hospital, Barcelona; c – Children's and Youth Mental Health Center, Riga.

Emotional experience is the second design aspect of inclusive wayfinding. In healthcare wayfinding design, especially in high-pressure pediatric settings, predictability becomes particularly important for children with special needs. A study on the visual design of wayfinding systems in medical interiors shows that readability, information coherence, and signage placement are critical to navigation in complex healthcare environments [5]. This design perspective is especially important in pediatric healthcare settings, where route confirmation and emotional stability are closely linked during movement. Built-environment research on autistic children shows that lighting and color conditions influence mood and behavior [4]. Accordingly, inclusive wayfinding should reduce glare, extreme contrast, and visual noise to support predictability through low-stimulation presentation. In practice, “buffering” near decision points becomes important. Simplified cues, stable color logic, and short transition areas for brief pauses help prevent emotional escalation. The wayfinding design at the Sant Joan de Déu Children’s Hospital uses landmarks, routes, and playful imagery to help children to anticipate what comes next and maintain a sense of stability while moving (Fig. 1:b).

The third design aspect of inclusive wayfinding is autonomy-supportive guidance. From a design perspective, the challenge is not only whether children can understand a single sign, but whether they can maintain a stable expectation of what happens next while moving through space. A more effective approach is to organize information step by step along the route, provide explicit next-step cues at decision points, and allow children or caregivers to confirm the route in ways that fit their needs. Research on hospital digital wayfinding reports reduced task complexity and stress, along with greater user control and empowerment, which supports a progressive and confirmable guidance logic [2]. For example, at the Riga Children’s and Youth Mental Health Center (Fig. 1:3), wayfinding is integrated with environmental graphics as a predictable cue system: areas are differentiated through color and butterfly motifs, supported by large numbers, text, and pictograms, while child-eye-level screens near exam-room doors provide anticipatory room-related information. Similar preparation strategies are also documented in cultural settings, such as museums. A study of autistic children visiting a public museum found that pre-visit materials helped support participation and reduced stress associated with crowds, noise, and waiting [1]. In this sense, wayfinding functions not only as direction-giving, but also as a rehearsable action script that supports both navigation and emotional stability.

Taken together, these findings show that inclusive wayfinding depends on system-level coordination rather than isolated design interventions. Clear and consistent cues reduce interpretation burden, low-stimulation and predictable presentation mitigates distress, and stepwise guidance with preparatory information strengthens perceived control.

CONCLUSIONS

Through case-based synthesis, this paper examines inclusive wayfinding for children with special needs from a design perspective. The findings are organized into three design aspects: cognitive legibility, emotional experience, and autonomy-supportive guidance. Across the cases, effective support depends on a stable,

confirmable cue chain along main routes and at decision points. In design terms, this is achieved through clear and consistent cues that reduce interpretation burden, low-stimulation and predictable presentation that mitigates distress, and stepwise guidance with preparatory information that strengthens perceived control. Future work should test these design aspects through field observation and user feedback across different settings and different types of support needs.

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АСПЕКТИ ДИЗАЙНУ ІНКЛЮЗИВНОЇ СИСТЕМИ ОРІЄНТАЦІЇ ДЛЯ ДІТЕЙ З ОСОБЛИВИМИ ПОТРЕБАМИ

У статті розглядаються особливості проєктування системи орієнтування, яка підтримує дітей з особливими потребами у громадських середовищах. На основі аналізу репрезентативних випадків визначено теоретичні аспекти проєктування, зокрема когнітивну читабельність, емоційний досвід та візуальну інтерпретацію. Показано, що ефективні багаторівневі сигнальні системи ґрунтуються на чітких та послідовних підказках, які легко розпізнати та підтвердити вздовж маршруту, що допомагає зменшити невизначеність та стрес під час руху. Ці висновки об'єднані в компактний набір рекомендацій для покращення практик орієнтування, зручних для дітей.

Ключові слова: *дизайн візуальної комунікації; інклюзивне орієнтування; система знаків; діти з особливими потребами; емоційний досвід; навігаційна система.*