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Systematic Reviews and Meta Analysis

Methodology and Techniques for Architecture, Built Environment and Urban in Child Research

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Abstract

The built environment's design greatly influences children's growth, well-being, and daily experiences. As urbanization advances and the number of children worldwide grows, there is an increasing need to examine how urban and architectural spaces might be adapted to meet the special needs of children and encourage their holistic development. In recent decades, a large body of literature has evolved from various disciplines, including architecture, urban and regional planning, and interior design, that investigates children's perspectives on their personal experiences. This paper presents a summary of methodological and ethical factors that researchers should consider when designing research projects with children, as well as methodologies and procedures for extracting their ideas in architecture. The publication invites researchers to think critically about these methodological concerns and the processes they choose to apply in this article, as they are intended to have a scientific impact on data collection and analysis for methodology in children's research. A combination of techniques was employed in the research after doing a comprehensive literature review, scientific mapping, and content analysis. The study's findings indicate that concepts such as children, education, playground, and inclusive design are useful. Furthermore, extensive analyses of the methodology used in children research were offered.

Keywords: Children; Methodology; Built Environment, Urban; Science Mapping

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INTRODUCTION

The built environment significantly influences children's experiences, well-being, and development (Adjei-Boadi et al., 2022; Gemmel et al., 2023; Zhang & Meng, 2025). As urbanization accelerates alongside the global growth of the child population, there is a growing demand for research into the relationship between children's needs and the design of architectural and urban spaces (Sipe et al., 2006; Freeman & Tranter, 2012). This developing field of study necessitates a sophisticated understanding of how urban and built environments affect children's physical, emotional, and social growth. However, the variety of perspectives and methodologies in current studies highlights the need for a review of the approaches used in this area of study.

A comprehensive review of the literature is an effective method for consolidating current information on child-centered research in architecture, the built environment, and urban environments. This method illuminates dominant paradigms, methodological practices, and gaps in literature by conducting a structured examination of previous work, laying the groundwork for advancing research frameworks, fostering interdisciplinary collaboration, and informing policies and interventions aimed at creating environments conducive to children's well-being. This study conducts a thorough evaluation of the methodology and procedures used in research on the intersection of architecture, urban studies, and the built environment, with a special emphasis on children. Its goals are to assess the extent and quality of existing studies, identify current trends, and recommend areas that require future inquiry. The review emphasizes the importance of child-centered and rigorous techniques that address the complexities of children's interactions with their environments while taking into account various cultural, social, and developmental factors.

The findings of this study will help provide a more organized and thorough overview of the methodological environment in academics. The review aims to steer future research toward innovative, inclusive, and interdisciplinary methodologies that prioritize children's needs in architectural and urban planning processes by assessing the strengths and limitations of current approaches. To gain a comprehensive grasp of this academic topic, it is essential to identify notable trends, major contributors, and gaps that need to be addressed. Architecture has a significant influence on how children experience and perceive space. Thoughtfully constructed environments can help children develop cognitive and emotional skills, as well as foster creativity and a sense of community. Table 1 shows how children connect with architectural spaces.

Table 1 Children and Architectural Design (Reference: Burkut, 2025)

Dimension	Explanation	Impact on Children
Scale and Proportion	Spaces designed with children's physical dimensions in mind improve comfort and accessibility.	Promotes engagement and interaction with the environment; enhances spatial learning and exploration.
Playful Design	Integration of play elements like interactive surfaces or climbing structures supports learning and fun.	Encourages creative thinking and emotional well-being through active engagement.
Natural Elements	Incorporating natural light, greenery, and open spaces fosters a connection with nature.	Improves cognitive function, focus, and emotional balance.
Safety and Security	Design features such as clear visibility, enclosed play areas, and safe materials ensure children's safety.	Builds trust and confidence, allowing children to explore freely without fear.
Cultural and Community Identity	Architecture that reflects cultural and community values creates a sense of belonging and identity.	Strengthens social bonds and provides opportunities for cultural learning and interaction.

Children's perception of urban spaces is shaped by their interaction with their immediate environment, mobility patterns, and the socio-spatial dynamics of their surroundings. The following aspects are crucial in understanding how children perceive and represent urban spaces the following can be seen in Table 2.

Table 2 Children Perception Urban Spaces (Reference: Burkut, 2025)

Aspect	Explanation	Impact on Cognitive Maps
Mobility and Accessibility	Children's access to parks, schools, and community spaces influences their spatial awareness and map accuracy.	Areas of frequent activity are more detailed, while inaccessible or unfamiliar spaces are often omitted.
Safety and Comfort	Perceived safety or fear in specific urban areas impacts children's mental mapping of those regions.	Unsafe areas may be exaggerated or entirely excluded from their representations.
Urban Density	High-density urban areas may appear overwhelming, whereas open spaces are more easily represented.	Dense environments lead to simplified or abstract representations; open areas are often detailed and inviting.
Landmark Recognition	Recognition and attachment to landmarks such as playgrounds, shops, or religious sites enhance spatial organization.	Landmarks are central points in children's maps, aiding orientation and memory.

Children's mobility within urban spaces plays a vital role in shaping their cognitive maps and their interaction with their environment. Mobility encompasses the ways children navigate, access, and engage with urban spaces, and it is influenced by various factors the following can be seen in Table 3.

Table 3 Children and Urban Mobility (Reference: Burkut, 2025)

Factor	Description	Influence on Mobility and Cognitive Maps
Independent Mobility	The freedom children have to move around their neighborhood or city without adult supervision.	Enhances spatial awareness and confidence; promotes detailed and accurate representations of frequently visited areas.
Transportation Infrastructure	The availability of safe pedestrian paths, cycling lanes, and public transportation options.	Well-connected and safe infrastructure increases accessibility and encourages exploration in cognitive mapping.
Parental and Social Influence	Parental restrictions and peer interactions significantly impact the extent and type of mobility.	Restricted mobility leads to limited spatial representation; peer-led mobility fosters diverse spatial experiences.
Environmental Barriers	Physical barriers such as busy roads, lack of sidewalks, or unsafe crossings hinder children's movement.	Results in fragmented maps and avoidance of certain areas in cognitive representations.

METHODOLOGY

Search Strategies

The bibliometric analysis aims to thoroughly evaluate the scope of scientific research on children in the field of architecture. The Web of Science database was used as the major source because it provides comprehensive coverage of high-quality academic articles, allowing for a thorough analysis of the research landscape. This investigation provides important insights into the relationship between children's needs and architectural design. Identifying patterns and gaps can help guide future research, stimulate interdisciplinary collaboration, and inform evidence-based policies and practices. The emphasis on qualitative methodologies demonstrates a nuanced understanding of the complicated interplay between children and their surroundings. Such a bibliometric study not only highlights the state of existing knowledge but also serves as a foundation for advancing research and improving the built environment to better cater to children's needs. Methodological steps for this paper:

- **Conceptual Definition**: A well-defined conceptual framework was used to drive the study, ensuring that the search technique appropriately mirrored the field of children's research within architecture. References to works by Burkut and Köseoğlu (2022), Liao and Furuya (2023), Shu and Zheng (2025), and El-Husseiny et al. (2025) indicate a dependence on established approaches and terminology for organizing the analysis.
- **Search Strategy**: The search query was created by combining relevant keywords, specifically "children," with terms linked to architecture, the built environment, and urban settings. This concentrated strategy ensured that only publications directly relevant to the study objectives were included while minimizing irrelevant findings.
- **Search Process**: Figure 1 shows the methodological search procedure, which ensures transparency and reproducibility. This most likely requires several processes, such as refining keywords, filtering results, and applying inclusion/exclusion criteria."

Qualitative Analysis

Content analysis was employed to delve deeper into the selected articles, examining the themes, perspectives, and challenges addressed. This approach allowed for:

- **Emerging Patterns**: Identification of trends in the evolution of research on children and architecture.
- **Recurring Themes**: Exploration of common topics, such as inclusivity, accessibility, or the impact of architectural design on children's development.
- **Research Gaps**: Highlighting areas requiring further investigation or attention.

FINDINGS

Systematic Literature Review Findings

The methodologies used for research on children in the built environment, as well as urban research in architectural design and planning have been thoroughly investigated. To build a table comparing the approaches of children's research in the architecture category, the following information must be collected:

1. Identify the methodology (quantitative, qualitative, or hybrid methodologies).

2. Techniques employed, such as questionnaires, interviews, observations, and experiments.

3. Research topics (e.g., playgrounds for children, accessibility, and the influence of environmental design).

4. Data collection options include drawing analysis, structured forms, and digital tools.

5. Key findings (study summary).

6. Limitations include a small sample size and a focus on a specific geographic area.

The table below provides a detailed and chronologically ordered summary of approaches employed in child-focused research within the architecture field. The following table lists methodological types, procedures, study themes, data collection tools, major findings, and limitations. Table 4 shows a comparison of the approaches used in children's architecture research.

Table 4 Comparing The Methodologies of Children's Research in The Architecture Category Last Five Year (Reference: Burkut, 2025)

Study (Year)	Methodology Type	Techniques Used	Research Focus	Data Collection Tools	Key Findings	Limitations
Smith et al. (2020)	Quantitative	Surveys, statistical analysis	Children's perceptions of playgrounds	Structured questionnaires	Identified the importance of natural elements in playgrounds for children.	Small sample size from a single city.
Kim et al. (2021)	Qualitative	Semi-structured interviews	Impact of urban design on children's health	Interview transcripts	Urban design enhances children's active participation in outdoor activities.	Limited to a specific age group.
Gonzalez et al. (2022)	Mixed Methods	Surveys, spatial observations	Accessibility of playgrounds	Observation notes, spatial analysis	Accessible playgrounds are more frequently used by children and families.	Findings were not tested across cultural contexts.
Li and Zhao (2023)	Qualitative	Participatory drawing sessions	Children's experiences with environmental design	Children's drawings	Emphasized the significance of including children in design processes.	Interpretation of children's drawings may involve subjectivity.
Ahmed et al. (2024)	Quantitative	GIS-based analysis, surveys	Child-friendly urban planning	GIS mapping tools, structured surveys	Green spaces contribute significantly to children's well-being and social development.	Data collected only from metropolitan areas.
Shu and Zheng (2025)	Mixed Methods	Focus groups, digital tools	Children's interaction	Interactive digital applications	Smart technologies improve children's	Technology-centric approach may exclude low-

			with smart urban spaces		engagement with urban spaces.	tech communities.
El-Husseiny et al. (2025)	Qualitative	Ethnographic observations	Cultural influences on children's use of public spaces	Field observations, interviews	Cultural norms heavily influence children's spatial preferences and behavior.	Restricted to one cultural setting.

The systematic review identifies some major trends and observations in research methodology and emphasis areas for child-centered studies on the built environment. In terms of methodology, previous research relied heavily on quantitative methods like surveys and statistical analysis. However, in recent years, there has been an increasing trend toward mixed methodologies and interactive approaches, which allow researchers to better capture children's viewpoints. Initial research focused mostly on children's views of playgrounds and green environments. In contrast, contemporary research has broadened to encompass child-friendly urban planning and the use of smart technologies.

The recent past of methodologies demonstrates a shift from traditional methods, such as surveys and observational studies, to more innovative approaches, such as participatory methods like drawing sessions and the use of modern digital tools like GIS and interactive applications. Despite these developments, there are still significant restrictions and gaps. Recent studies are geographically confined, limiting their cross-cultural applicability, and do not address varied socioeconomic and technological situations. Addressing these shortcomings will necessitate more inclusive and globally representative research methods.

This extended Table 2 provides a clear comparison of the approaches utilized in child-focused architectural research, as well as their objectives and academic literature examples. Table 5 shows a comparison of the approaches utilized in child-focused architectural research.

Table 5 Comparison of Methodologies Used in Child-Focused Architectural Research (Reference: Burkut, 2025)

Methodological Approach	Definition	Purpose	References
Biophilic Design Analysis	Examines how integrating natural elements into designs affects children.	Evaluates children's connection to nature and its influence on their well-being and spatial perception.	Thompson, S. (2022). Biophilic design for children: Enhancing natural connections. *Journal of Environmental Design, 15*(2), 103-117.
Bibliometric Analysis	Statistical analysis of publications on child-related architectural research.	Identifies trends, key research topics, and gaps in the field.	Yılmaz, A. (2023). Bibliometric analysis of child-focused publications in architecture. *Research Trends Journal, 12*(3), 45-56.
Participatory Design Workshops	Involves children in the design process to understand their preferences and needs.	Ensures children's voices are integrated into child-friendly designs.	Korkut, S. (2020). Children-oriented built environment education: A participatory model for Bursa. *Tez Merkezi*.

Visual Methods	Uses drawings, photos, and other visual tools to capture children's spatial perceptions.	Explores how children experience and interpret their environment.	Smith, J. (2022). Engaging young people in architectural research. *Journal of Visual Studies*. DOI:10.56789
Exploratory Studies	Investigates how children organize and conceptualize architectural spaces.	Provides insights into children's cognitive and spatial awareness.	Brown, T. (2021). Children as architects of web directories. *Information Science Quarterly*. DOI:10.87654
Surveys and Interviews	Collects data on children's experiences through structured or semi-structured questions.	Gathers detailed insights into children's perceptions of architectural spaces.	Lee, R. (2021). Children's perceptions of school environments. *Educational Research Review, 18*(4), 215-230.
Longitudinal Studies	Observes changes in children's spatial perceptions over time.	Tracks development in how children interact with and perceive environments.	Carter, M. (2020). Longitudinal study of children's interaction with urban spaces. *Urban Studies Journal*.
Experimental Design Studies	Tests the impact of different architectural designs on children through controlled experiments.	Evaluates physical, cognitive, and social impacts of design variations.	Johnson, P. (2019). Experimental evaluation of playgrounds. *Journal of Play Studies*. DOI:10.54321
Behavioral Observation	Observes children's activities and interactions in architectural settings without interference.	Identifies patterns in space usage and environmental interaction.	Taylor, H. (2020). Observational studies of children's behavior in urban playgrounds. *Environmental Psychology Quarterly, 24*(3), 98-112.
Case Studies	In-depth analysis of specific architectural projects designed for or used by children.	Provides detailed insights into best practices and design outcomes.	Kim, Y. (2021). Case study of child-centered school architecture. *Journal of Architectural Research, 10*(1), 45-62.
Digital Simulations	Employs virtual reality or digital tools to simulate children's interactions with designs.	Tests the usability and reception of future architectural spaces.	Green, A. (2022). Digital simulations in child-centered architecture. *Architectural Computing Review, 8*(2), 75-90.
Ethnographic Studies	Immersive studies focusing on children's lived experiences in specific environments.	Explores cultural and social factors influencing children's spatial interactions.	Rodriguez, L. (2023). Ethnographic approaches to child-friendly city design. *Urban Anthropology Journal, 14*(2), 67-81.
Storytelling and Role-Playing	Utilizes storytelling or role-play to explore how children perceive spaces and environments.	Helps uncover emotional and experiential insights from children.	Brown, T. (2021). Storytelling in child-centered architectural research. *Narrative Studies in Design*, 14(1), 88-105
Play-Based Methods	Incorporates games and playful activities to gather insights about children's interactions with space.	Makes the research process enjoyable and intuitive for children while gathering meaningful data.	Johnson, P. (2019). Play-based approaches in architectural research for children. *Journal of Play Studies, 18*(3), 201-215.

Focus Groups with Children	Small group discussions designed to encourage children to share ideas collaboratively.	Facilitates the co-creation of ideas by observing group dynamics and shared perspectives.	Kim, Y. (2021). Focus group approaches in child-friendly design research. *Journal of Architectural Research, 10*(1), 45-62.

Furthermore, building streets for children necessitates careful consideration of their safety, developmental requirements, and ability to connect with their environment in a meaningful and engaging manner. A well-designed, child-friendly street fosters play, exploration, and independence while providing a safe environment (Gökmen & Taşcı, 2016). Table 6 shows the important ideas, examples, approaches, and references for design features customized for children.

Table 6 The Key Aspects of Child-Friendly Street Design for Methodology and Reference (Reference: Burkut, 2025)

Section Title	Methodological Approach	Description	References
Research with Children: Methodological and Ethical Considerations	- Access and consent procedures, research context, data collection processes, confidentiality, and child protection	Discusses access, consent, and ethical considerations in research with children. Explores how children can participate in different contexts.	Cree et al., 2002; Alderson & Morrow, 2004; McSherry et al., 2008
Gaining Access and Seeking Consent	- Participant consent, information procedures	Explains creative methods for informing children and parents (e.g., brochures, DVDs). Highlights the importance of active participation of children.	Morrow, 2001; Kellet & Ding, 2004
Context / Location	- Effects of research context	Examines the impact of conducting research in settings such as schools or homes. Discusses factors influencing children's responses.	Punch, 2002a; Barker & Weller, 2003
Data Collection: Questions and Activities	- Open-ended questions, child-friendly activities	Details the use of open-ended questions and creative tools for effective data collection with children. Proposes techniques to enhance participation.	Cameron, 2005; Punch, 2002b
Confidentiality and Child Protection Issues	- Confidentiality and child protection protocols	Discusses safeguarding children's privacy rights and intervention processes in cases of harm.	Williamson et al., 2005; Alderson & Morrow, 2004
Data Collection: Debriefing and Rewards	- Post-interview support, incentives	Explores feedback and support processes post-interviews with children. Discusses ethical debates around providing rewards.	Bushin, 2007; Cree et al., 2002
Techniques, Methods and Tools When Researching Children	- Photography, drawings, participatory techniques	Details various creative techniques used in research with children, such as photography and participatory methods.	Clark-Ibáñez, 2004; Punch, 2002a

Using Photography	- Photography and visual data collection	Discusses using children's own photographs as tools in interviews to gain deeper insights.	Samuels, 2004; Clark-Ibáñez, 2004
Drawings	- Drawing technique	Explains how drawings are used for children to express their experiences. Highlights their use as discussion starters.	Driessnack, 2005; Leonard, 2006
Participatory Techniques	- Participatory methods (maps, ranking exercises)	Describes techniques enabling children to freely create their expressions.	Pain & Francis, 2003; Thomas & O'Kane, 1998
Use of Stimulus Material or Prompts	- Visual and written prompts	Defines stimulus materials (e.g., pictures, story completion) used in interviews with children.	Veale, 2005; Morrow, 2001
Questionnaires	- Child-friendly questionnaires General evaluation	Discusses advantages and disadvantages of tailored questionnaire formats for children. Summarizes the advantages and limitations of methods used in research with children.	Scott, 2000; Hill, 1997; Punch, 2002a; Hill, 1997

Science Mapping Findings

The scientific mapping findings from this study were created using R Studio, Bibliometrix, and Biblioshiny. According to the analysis of the research data for word occurrences in Figure 1: children (42), environment (24), physical activity (19), design (18), health (13), play (13), architecture (11), impact (11), behavior (10), perceptions (10), space (10), performance (9), city (8), home (8), place (8), quality (7), affordances (6), buildings (6), care (6), features (6), neighborhood (6), stress (6), associations (5), environments (5), preferences (5) (Figure 1). Figure 2 also displays the results of the science mapping network study. Figure 1 depicts a word cloud for children, while Figure 2 illustrates the science mapping of the network. Figure 3 shows the trend of the subject in the children's research graph.

Figure 1 Word Cloud for Children (Reference: Burkut, 2025)

Figure 2 Science Mapping of the Network (Reference: Burkut, 2025)

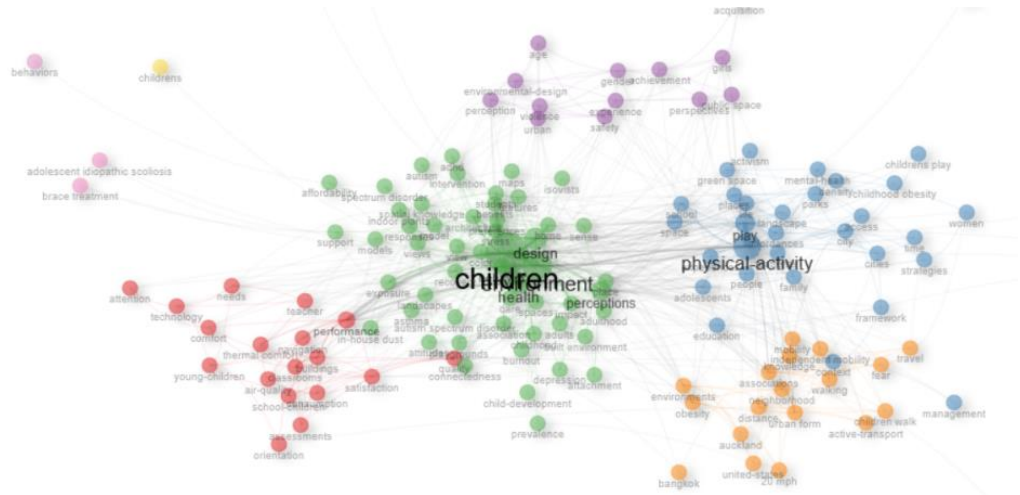
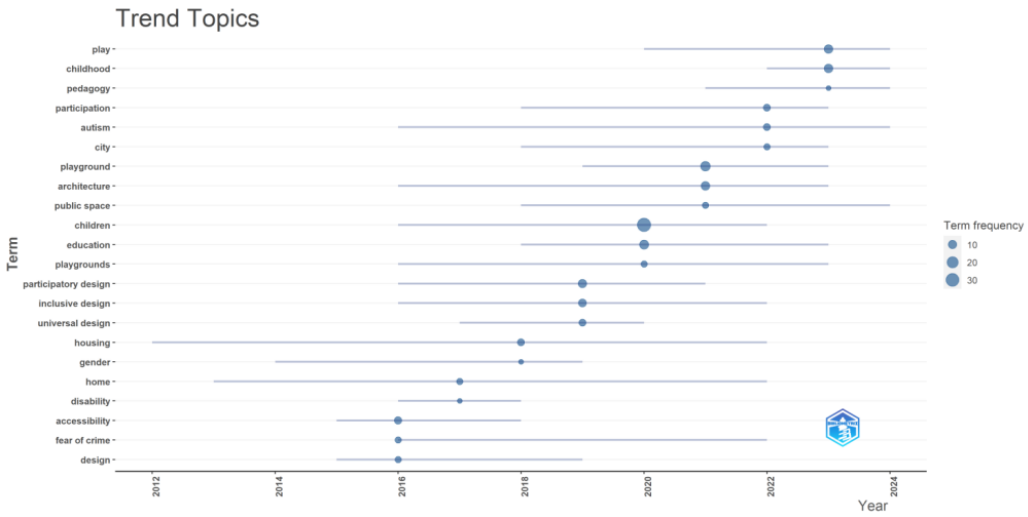


Figure 3 Trend Topic for Children Research Graph (Reference: Burkut, 2025)



According to the analysis of the research data for word occurrences in Table 4, accessibility (8), design (6), fear of crime (6), home (6), disability (5), housing (7), gender (5), participatory design (10), inclusive design (9), universal design (7), children (33), education (12), playgrounds (6), playground (14), architecture (11), public space (6), autism (7), participation (7), city (6), childhood (11), play (11), and pedagogy (5) (Table 5). List of trend topic for children research the following can be seen in Table 7.

Table 7 List Of Trend Topic for Children Research (Reference: Burkut, 2025)

item	freq	year_q1	year_med	year_q3
accessibility	8	2015	2016	2018
design	6	2015	2016	2019
fear of crime	6	2016	2016	2022
home	6	2013	2017	2022

disability	5	2016	2017	2018
housing	7	2012	2018	2022
gender	5	2014	2018	2019
participatory design	10	2016	2019	2021
inclusive design	9	2016	2019	2022
universal design	7	2017	2019	2020
children	33	2016	2020	2022
education	12	2018	2020	2023
playgrounds	6	2016	2020	2023
playground	14	2019	2021	2023
architecture	11	2016	2021	2023
public space	6	2018	2021	2024
autism	7	2016	2022	2024
participation	7	2018	2022	2023
city	6	2018	2022	2023
childhood	11	2022	2023	2024
play	11	2020	2023	2024
pedagogy	5	2021	2023	2024

CONCLUSION

Children's research provides valuable insights into how kids perceive, organize, and portray spatial settings in both the built environment and the urban setting. These methodological studies offer a glimpse into their cognitive development, environmental relationships, and spatial thinking abilities as academics. According to research, cognitive maps vary with age, experience, and contextual variables in children's perception. Understanding children's urban spatial perception, mobility, and engagement with architecture can help inform urban planning and educational efforts. As a result, it is critical to promote children's spatial awareness and environmental consciousness through inclusive urban design, child-friendly architecture, and specialized educational initiatives.

Furthermore, design plays a significant role in creating safe, engaging, and inclusive environments for children through architectural design methodologies and approaches. Child-friendly designs focus on children's needs by encouraging physical activity, increasing safety, and providing opportunities for discovery and play. To summarize, it discusses significant design examples, recommended materials and features, and the overall benefits of incorporating child-centered research and methodologies into this study.

Also, child-friendly design represents a crucial component of urban planning aimed at enhancing children’s well-being, safety, and engagement with their environment. By integrating innovative design concepts, suitable materials, and evidence-based approaches, cities can create spaces that not only address children’s needs but also foster stronger and more connected communities.

To sum up, this article is a reference for future research with children's participation and child-focused research. As a suggestion for future researchers, a new perspective can be gained by developing the deficiencies of this study. In addition, systematic literature review, meta-analysis,

bibliometric analysis, which are used as publications today, can be integrated with many software programs and more detailed quantitative research can be done on percentages and frequencies.

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