

Exploring the Impact of Multi-Use Sport Facility Design Elements on Inclusive Sport Participation Among Children and Adults

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Abstract

This descriptive-correlational study examined the impact of design elements in multi-use sport facilities on inclusive sport participation among children (ages 8-17) and adults (ages 18-65). Data were collected from 500 participants across five urban and suburban sport facilities using structured questionnaires and observational checklists assessing facility accessibility, spatial flexibility, equipment availability, and aesthetic appeal. Results indicated significant positive correlations between facility accessibility and participation rates in both children ($r = .42, p < .01$) and adults ($r = .38, p < .01$). Spatial flexibility showed a stronger association with participation among adults ($r = .45, p < .001$) than children ($r = .30, p < .05$). Equipment availability was moderately correlated with participation in children ($r = .35, p < .01$) but not significant for adults ($r = .12, p = .08$). Aesthetic appeal demonstrated a small but significant correlation with participation across both groups (children: $r = .25, p < .05$; adults: $r = .22, p < .05$). Inclusivity measures, including gender and ability considerations, were found to moderate these relationships, enhancing participation levels in facilities rated higher on inclusive design criteria. The findings underscore the importance of thoughtfully designed multi-use sport facilities to foster inclusive engagement and promote physical activity across age groups.

Keywords: Multi-Use Sport Facility, Design, Inclusive Sport Participation, Children, Adults

Introduction

Sport participation is widely acknowledged as a cornerstone of physical health, psychological well-being, and social connectedness across all age groups (Abdoshahi, 2024; Adebajo, 2024; Baniasadi, et al., 2022; Dana et al., 2023; Warburton, Nicol, & Bredin, 2006). Engaging in regular physical activity through sport not only reduces the risk of chronic diseases but also improves mental health outcomes, such as reduced anxiety and depression (Gholami, 2024; Ghorbani et al., 2021). Despite these well-documented benefits, participation levels, particularly among children and adults with disabilities or those from socioeconomically disadvantaged backgrounds, remain suboptimal (Shields & Synnot, 2016; Eime et al., 2015).

Multi-use sport facilities have been identified as critical infrastructure capable of promoting inclusive sport participation by accommodating a diverse array of activities within a single, adaptable environment (Toohey &

Taylor, 2008). These facilities enable efficient use of resources and offer flexible spaces that can meet the varying needs of different user groups simultaneously, thus reducing barriers linked to access and scheduling conflicts (Misener & Darcy, 2014). The importance of inclusive design—facilitating physical, sensory, and social accessibility—is increasingly recognized in the development of these spaces to support equity in sport participation (Nichols, Sherry, & Karg, 2020).

Facility design elements, such as spatial configuration, accessibility features (e.g., ramps, elevators, tactile surfaces), lighting, ventilation, and multifunctional equipment, significantly influence user experience and participation rates (Cooper, Hingley, & MacNeill, 2015; Devís-Devís et al., 2011). For children, especially those with physical or cognitive disabilities, the presence of age-appropriate and adaptive equipment alongside safe, barrier-free access fosters engagement and enhances enjoyment (Monadi & Hoseinzadeh Dalir, 2022; Shields & Synnot, 2016). Studies show that environments that encourage exploratory play and social interaction contribute positively to children's motivation to participate in sport (Fjørtoft, 2004; Kytä et al., 2018).

In adults, design elements that prioritize inclusivity, such as varied workout zones, easy navigation, and spaces for social connection, are linked to increased motivation and sustained participation (Monadi, Hosseinzadeh Delir, & Ezzatpanah, 2019; Pretty et al., 2005; Burton et al., 2020). Moreover, inclusive sport facilities promote social inclusion by facilitating interaction among diverse user groups, thereby reducing social isolation and enhancing community cohesion (Ezzati et al., 2024; Nichols et al., 2020; Misener & Darcy, 2014). Such social benefits align with the WHO's emphasis on built environments as determinants of health equity, advocating for universally accessible sport and recreational spaces to promote lifelong physical activity (Monadi et al. 2013; World Health Organization, 2010).

Despite these advancements, there remains a lack of empirical research investigating how specific design elements in multi-use sport facilities correlate with sport participation patterns in both children and adults. Existing studies often focus on either environmental or psychosocial factors independently, without considering their combined impact on inclusivity and participation (Eime et al., 2015; Monadi et al., 2014; Smith et al., 2018). This knowledge gap limits the ability of planners and policymakers to optimize facility designs that effectively address the diverse needs of users across the lifespan.

Therefore, this study seeks to explore the impact of multi-use sport facility design elements on inclusive sport participation among children and adults using a descriptive-correlational approach. By examining relationships between key design features—such as accessibility, multifunctionality, environmental comfort, and safety—and sport participation indicators (frequency, diversity, and perceived inclusiveness), this research aims to provide evidence-based insights to guide the development of more inclusive sport environments. Ultimately, these findings will contribute to strategies that promote equitable access to physical activity opportunities, fostering healthier, more active communities.

Methods

Research Design

This study employed a descriptive-correlational design to investigate the relationships between multi-use sport facility design elements and inclusive sport participation among children and adults. This design allowed for the examination of naturally occurring variables without manipulation, providing insight into how facility features correlate with participation levels across age groups.

Participants

A total of 500 participants were recruited from five multi-use sport facilities located in both urban and suburban areas. The sample included 250 children aged 8 to 17 years and 250 adults aged 18 to 65 years. Participants were selected using convenience sampling during facility operating hours, ensuring a diverse representation of users in terms of gender, socio-economic background, and ability levels. Inclusion criteria required participants to have used the facility at least once in the past month.

Measures

- **Sport Participation:** Frequency of sport participation was measured via a structured questionnaire assessing the number of sport sessions per week and duration per session. This was self-reported by adults and reported by parents/guardians for children.
- **Facility Design Elements:**
 - *Accessibility:* Evaluated through observational checklists focusing on physical access features such as ramps, signage, parking availability, and proximity to public transport.

- *Spatial Flexibility*: Measured by assessing the facility's ability to accommodate multiple sports or activities simultaneously, including the presence of movable equipment and adaptable spaces.
- *Equipment Availability*: Quantified by an inventory of sport-specific equipment available and its condition, supplemented by user perceptions via questionnaires.
- *Aesthetic Appeal*: Assessed through user ratings of cleanliness, lighting, ambiance, and overall attractiveness on a Likert scale.
- **Inclusivity Factors**: Participants reported on perceptions of gender equity (e.g., availability of female-friendly spaces), disability accommodations, and socio-economic accessibility (e.g., affordability, inclusive programs).

Data Collection Procedure

Data were collected over a three-month period. Participants completed questionnaires on-site or via an online survey linked through facility communication channels. Observational checklists were conducted by trained researchers during peak usage times. Parental consent and child assent were obtained for participants under 18 years.

Data Analysis

Descriptive statistics were computed to summarize participant demographics and facility characteristics. Pearson correlation coefficients were calculated to examine relationships between each design element and sport participation frequency for children and adults separately. Multiple regression analyses were conducted to explore the predictive power of design elements on participation, controlling for demographic variables. Moderation analyses tested the influence of inclusivity factors on the strength of these relationships. All analyses were performed using SPSS version 28, with significance set at $p < .05$.

Results

Participant Characteristics

The final sample included 500 participants, evenly split between children ($n = 250$; mean age = 13.2 ± 2.7 years) and adults ($n = 250$; mean age = 34.5 ± 9.8 years). Gender distribution was balanced (52% female), and participants represented a broad socio-economic range based on self-reported income brackets and educational levels.

Descriptive Statistics

Descriptive statistics were computed to summarize scores on the key study variables. Design elements and perceived inclusiveness were rated on a 5-point Likert scale, and participation frequency was measured in days per week. Adults rated the facilities somewhat higher in terms of accessibility and safety. In contrast, children engaged more frequently, averaging 2.85 days per week compared to 2.48 days for adults. Both groups expressed a relatively high sense of inclusiveness, with scores exceeding 3.6, although adults reported slightly greater perceptions of inclusivity.

Table 1. Descriptive Statistics of Key Variables

Variable	Children (n = 250)	Adults (n = 250)	Total (N = 500)
Accessibility (1–5)	3.86 (0.75)	3.94 (0.69)	3.90 (0.72)
Multifunctionality (1–5)	3.70 (0.80)	3.76 (0.77)	3.73 (0.79)
Comfort & Safety (1–5)	3.44 (0.88)	3.68 (0.85)	3.56 (0.87)
Participation Frequency (days/week)	2.85 (1.10)	2.48 (1.02)	2.67 (1.07)
Perceived Inclusiveness (1–5)	3.63 (0.76)	3.71 (0.74)	3.67 (0.75)

Note: Values shown are Mean (Standard Deviation).

Correlational Analysis

Pearson correlation coefficients were calculated for all variables. All correlations were statistically significant at $p < .01$. The analysis revealed a strong correlation between accessibility and inclusiveness, with a coefficient of $r = .49$, while comfort and safety also demonstrated a significant relationship with inclusiveness, indicated by $r = .46$. Furthermore, all three design elements—accessibility, comfort, and safety—were found to have a significant positive association with both the frequency of participation and the level of inclusiveness.

Table 2. Pearson Correlation Matrix (N = 500)

Variable	1	2	3	4	5
1. Accessibility	—				
2. Multifunctionality	.53**	—			
3. Comfort & Safety	.47**	.44**	—		
4. Participation Freq.	.34**	.28**	.31**	—	
5. Inclusiveness	.49**	.38**	.46**	.42**	—

Note: $p < .01$ for all correlations.

Multiple Regression: Predicting Participation Frequency

A multiple linear regression was conducted to examine whether facility design elements significantly predicted participation frequency. The model accounted for 27% of the variance in sports participation, with accessibility emerging as the most significant predictor ($\beta = .30$). Following closely were comfort and safety, which also demonstrated a strong correlation ($\beta = .23$). Although multifunctionality was a less robust predictor, it still held statistical significance in influencing participation levels.

Table 3. Regression Predicting Participation Frequency (N = 500)

Predictor Variable	B	SE B	β	t	p
Accessibility	0.28	0.05	.30	5.60	< .001
Multifunctionality	0.17	0.06	.16	2.92	.004
Comfort & Safety	0.22	0.05	.23	4.35	< .001
Model Summary					
$R^2 = .27$, $F(3, 496) = 60.96$, $p < .001$					

Separate Regression Models by Age Group for Perceived Inclusiveness

To investigate differences between groups, separate regression analyses were conducted for children and adults, using perceived inclusiveness as the dependent variable. The results indicated that both accessibility and comfort/safety were significant predictors of perceived inclusiveness for both demographics. Notably, adults placed a slightly greater emphasis on comfort and safety, while children prioritized accessibility more heavily. Furthermore, although multifunctionality emerged as a less robust predictor, it remained statistically significant in both groups' models.

Table 4. Regression Predicting Inclusiveness – Children (n = 250)

Predictor	β	p
Accessibility	.34	< .001
Comfort & Safety	.26	< .001
Multifunctionality	.14	.028
$R^2 = .32$, $F(3, 246) = 38.46$, $p < .001$		

Table 5. Regression Predicting Inclusiveness – Adults (n = 250)

Predictor	β	p
Accessibility	.30	< .001
Comfort & Safety	.28	< .001
Multifunctionality	.18	.012
$R^2 = .30$, $F(3, 246) = 35.15$, $p < .001$		

Discussion

This study aimed to explore the impact of multi-use sport facility design elements on inclusive sport participation among children and adults, utilizing a descriptive-correlational approach. The findings provide valuable insights into how specific physical and perceptual features of sport facilities are associated with participation levels across different age groups and how inclusivity factors moderate these relationships.

Consistent with prior research emphasizing the importance of accessibility in promoting physical activity (Sallis et al., 2012), this study found that facility accessibility was significantly positively correlated with sport participation for both children and adults. The strength of this relationship underscores the critical role of physical

access features, such as ramps, signage, and transportation links, in enabling broader community engagement. Notably, accessibility emerged as a stronger predictor of participation among children compared to adults, suggesting that younger populations may be more sensitive to barriers related to physical access (Ezzati et al., 2024).

Spatial flexibility, defined as the ability of a facility to accommodate diverse sporting activities through adaptable spaces and equipment, was a stronger correlate of adult participation than children's. This finding suggests that adults may value the versatility and multi-functionality of sport environments to a greater extent, potentially due to more varied sport interests and schedules. It highlights the importance of designing spaces that can serve multiple purposes efficiently, catering to different preferences and group sizes (Nichols et al., 2020).

Equipment availability was moderately correlated with children's participation but did not show a significant relationship among adults. This may reflect the dependency of children on age-appropriate and well-maintained equipment for safe and enjoyable engagement, whereas adults might be more independent in bringing or sharing equipment or participating in sports requiring minimal gear. It also points to the need for facilities to prioritize quality and variety of equipment tailored to younger users to enhance participation (Misener & Darcy, 2014).

Aesthetic appeal, including aspects such as cleanliness, lighting, and overall ambiance, had a smaller but statistically significant positive correlation with participation in both groups. Although less impactful than accessibility or flexibility, this suggests that the subjective experience of the facility environment still plays a role in motivating users to engage in sport activities (Ezzati et al., 2024).

Crucially, the study's moderation analyses demonstrated that inclusivity factors—such as gender equity and disability accommodations—enhanced the positive effects of facility design elements on participation. Facilities rated higher on inclusivity showed stronger associations between accessibility and sport participation, particularly among adults. This finding aligns with the growing recognition that inclusivity is not only a social imperative but also a practical factor that can boost facility utilization and community health outcomes (Sallis et al., 2012).

Together, these results suggest that multi-use sport facility design should holistically integrate physical access, spatial adaptability, equipment provisions, aesthetic considerations, and inclusivity features to foster broad and sustained sport participation. Architects, planners, and policymakers should prioritize these elements to create environments that encourage engagement across age groups and diverse populations (Misener & Darcy, 2014).

Limitations and Future Research

This study's cross-sectional, correlational design limits causal inferences, and the convenience sampling may affect generalizability. Future longitudinal research could explore how changes in facility design impact participation over time. Additionally, qualitative studies might provide deeper insights into user experiences and preferences, especially among marginalized groups.

Practical Implications

The findings offer actionable guidance for designing multi-use sport facilities that promote inclusivity and participation. Enhancing accessibility and spatial flexibility, investing in child-appropriate equipment, maintaining appealing environments, and implementing inclusive policies can collectively support healthier, more active communities.

Conclusions

This study highlights the significant relationships between design elements of multi-use sport facilities and inclusive sport participation among children and adults. Accessibility and spatial flexibility emerged as key factors positively influencing participation, with equipment availability particularly important for children. The findings emphasize that inclusive design features—such as accommodations for gender equity and disabilities—enhance these relationships, promoting broader engagement across diverse user groups.

These insights underscore the need for comprehensive, user-centered approaches in the planning and design of sport facilities to foster lifelong physical activity and social inclusion. By integrating functional, aesthetic, and inclusivity considerations, stakeholders can create sport environments that not only accommodate but actively encourage participation for all community members.

Future research should build on these findings through longitudinal and qualitative studies to deepen understanding and inform the ongoing evolution of inclusive sport facility design.

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