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Promoting Physical Activity through Architectural Design: Observation of Active Design Strategies in Open and Public Space

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Abstract

This study explores the implementation of active design principles across various architectural spaces through comprehensive photographic documentation and qualitative analysis. The research examines how built environments can promote physical activity and health through thoughtful design strategies in public spaces, open spaces, public buildings, and educational institutions. Through case studies across the United Kingdom and several European countries, the study documents and analyzes specific design features that encourage movement and physical activity. Key findings highlight the importance of accessible stairways, bicycle infrastructure, recreational areas, and well-designed open spaces in promoting active lifestyles. The research reveals that successful active design implementation depends on four core elements: ease of access and circulation, safety considerations, comfort through ergonomic design, and creative elements that engage users in physical movement. While the documented design solutions may not be directly transferable to regions with different climatic conditions, they provide valuable reference points for adaptation to local contexts. The study concludes that effective active design requires careful consideration of human behavior patterns and local cultural contexts, emphasizing the crucial role of architects, urban planners, and government bodies in developing culturally sensitive and climatically appropriate solutions.

Keywords: Active design, built environment, health-promoting design, physical activity, urban architecture

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Introduction

The concept of health and physical activity has received growing attention in recent architectural design practice. Built environment is a key determinant for the emergence of human behavior, in that it influences people's ways of using, moving, and experiencing space (Mouratidis 2021). Urban design, land use, and transportation systems that encourage walking and biking will make cities more active, healthier, and livable (Handy et al. 2002). It would be ideal if environmental decision-making procedures specifically included people's activity patterns as a critical criterion in order to encourage physically active lifestyles through design (Sugiyama 2008).

An architectural design concept was introduced to integrate physical activity into daily life through thought-out design and is now known as active design. The design is intentionally done to help in increasing movements that support better health and well-being (Mustafa and Ali 2023). In addition, there is some evidence to suggest that active design may be advantageous for enhancing physical health (Engelen 2020). Active design involves efforts to create an environment that supports and encourages physical activity by providing some types of features such as appealing staircases, walking paths, places for recreation, areas with greenery, and many more (David Lock Associates 2023).

Figure 1
Foundational Principle of Activity for All (David Lock Associates 2023)

The world is experiencing unprecedented urban growth, with the global urban population projected to increase from 4.4 billion in 2020 to 6.7 billion by 2050 (United Nations 2019). This rapid urbanization is reshaping our living environments and presenting new challenges for urban planning and public health (Giles-Corti et al. 2016). As cities expand to accommodate this growth, the design of urban spaces and transport policies becomes increasingly critical in shaping residents' lifestyles and health outcomes (Sallis et al. 2016). At the same time, there is an increase in sedentary lifestyle, which is linked to a lot of bad things happening to people, including higher stress levels (Priasmoro and Lestari 2023) and

a number of health issues, such as a higher risk of cancer, heart disease, metabolic disorders, and musculoskeletal disorders (Park et al. 2020). Therefore, with the ongoing expansion of cities, the need to create spaces that promote physical activity will become increasingly crucial. Having interactive, dynamic, and engaging environments will contribute not just to physical health but also to mental well-being.

The intent of the article is to explore several active design strategies through in-depth photographic documentation across public and open spaces. This study is intended to present examples both public spaces (shopping area, recreational spaces, streets) and open spaces (include park and other green area) to explain and illustrate these design features that would motivate one toward physical activity and health. The influence of active design on user behaviour and well-being will be elaborated with the help of accompanying descriptions and photographs as a kind of visual narrative.

The article also includes an introduction incorporating supporting literatures regarding active design principles and their general importance, followed by a methodology section explaining the design of the research and the data collection process. The article will be organized using thematic groupings of the active design strategies, objectively supported by descriptions, analysis, and photographic proof. It will then conclude with a synthesis of primary findings to propose practical recommendations for further studies or practice in active design.

The present study contributes to this ongoing discussion, re-examining the role of architecture in active healthful living. This paper will provide an explicit set of examples and visual gaps to inspire architects, urban planners, and policymakers in the strong integration of active design into the development of healthier built environments.

Methods

This study utilizes a qualitative descriptive approach combined with case study methodology to examine and document active design strategies in built environments. The qualitative descriptive approach was chosen for its ability to provide rich, straightforward descriptions of the architectural features and design elements that promote physical activity. This methodology allows for detailed observation and documentation of design interventions in their natural settings, enabling researchers to capture the nuanced ways in which active design principles are implemented across different contexts.

The case study component of our methodology provides a framework for in-depth examination of specific examples, allowing us to analyze how active design principles manifest in real-world applications. This approach is particularly suitable for understanding the complex interplay between architectural elements and their intended function in promoting

documentation and analysis of multiple cases, we can identify patterns, innovations, and best practices in active design implementation. The combination of qualitative description and case study methods enables both broad understanding of active design strategies and detailed examination of specific successful implementations.

Data collection consisted of photographic documentation of facilities across the United Kingdom and several European countries. All photographs were captured by the author using mobile phone cameras with a minimum resolution of 720dpi, meeting scientific publication standards. Site selection encompassed a diverse range of built environments incorporating active design principles, including both public spaces (shopping area, recreational spaces, streets) and open spaces (include park and other green area).

The methodology enables comprehensive visual analysis of active design features across these varied settings. However, it is important to acknowledge the limitation that static photographic documentation, while valuable for analyzing design implementations, cannot capture dynamic user behaviors or quantitatively measure the impact of these designs on physical activity levels.

Results and Discussion

Open spaces

Open spaces, including parks and playground, play a vital role in promoting physical activity and well-being. These areas provide opportunities for various forms of exercise, relaxation, and social interaction.

Figure 2
Playground for children

Firstly, parks with playgrounds are essential for children's physical and cognitive development (figure 2). Play is an essential aspect of children's overall development, offering a diverse range of opportunities for growth and nurturing important physical, emotional, cognitive, and soial skills (Nijhof et al. 2018). Designing or updating parks to meet the needs of children and their caregivers can boost physical activity across different age groups, effectively increasing both park use and active engagement among children (Padial-Ruz et al. 2021).

movement and physical activity. Through careful

Similar to other research, this suggests that a well-designed playground can attract a greater number of visitors to parks and motivate them to engage in more physical activity during their visit (Veitch et al. 2018). However, the design of these spaces is critical; playgrounds that incorporate natural elements and varied terrain have been found to stimulate more diverse and engaging play, contributing to better motor skill development and creativity.

Many parks now include mild exercise facilities for adults and seniors, in addition to the concept of active recreation for children. These installations, such as outdoor fitness equipment (figure 3) can significantly increase park usage and physical activity levels (Sami, Smith, and Ogunseitan 2018). While these facilities show promise in encouraging active lifestyles, their effectiveness can vary based on factors such as maintenance, cultural relevance, and integration with other park features.

Figure 3
Parks with fitness equipment

Next, from the green area with the workout activities, parks, especially with flower beds and botanical garden, also present chances for family meetings and relaxing walk (figure 4). These aesthetically pleasing environments not only encourage physical activity but also provide mental health benefits (Vujcic et al. 2017). However, it's important to note that the mere presence of such spaces is not enough; accessibility and perceived safety are crucial factors in determining their use and effectiveness in promoting public health.

Figure 4
Flower garden and botanical garden. Allows people to enjoy open areas with family

Lastly, dog-friendly parks present a unique opportunity to promote physical activity among pet owners (figure 5). Research indicates that dog owners who regularly walk their pets are more likely to meet recommended physical activity levels (Christian et al. 2018).

Lastly, dog-friendly parks present a unique opportunity to promote physical activity among pet owners (figure 5). Research indicates that dog owners who regularly walk their pets are more likely to meet recommended physical activity levels (Christian et al. 2018). Moreover, off-leash dog parks, while understudied, have the potential to enhance physical and social health and community connectedness, provided municipalities carefully consider park design, promote safe practices, and implement effective regulations to maximize benefits and minimize risks (Rahim et al. 2018). However, it's crucial to balance the needs of dog owners with those of other park users, addressing concerns such as hygiene and safety through thoughtful design and clear regulations.

Figure 5
A public park that can be accessed by anyone, including their pets. Encouraging people to be able to do activities outside the building

While these diverse park features offer numerous benefits, it's important to consider potential challenges. Issues such as equitable access, maintenance costs, and competing land use demands in dense urban areas must be addressed. Furthermore, the effectiveness of these spaces in promoting physical activity can vary across different demographic groups, highlighting the need for inclusive and culturally sensitive design approaches.

To sum up, open spaces and parks with diverse features can significantly contribute to promoting active lifestyles and community well-being. However, their success depends on thoughtful design, proper maintenance, and strategies to ensure equitable access and use across diverse urban populations.

Public spaces

Strategic design of public spaces is crucial in promoting safety, comfort, and active use, ultimately encouraging physical activity and enriching urban life.

For instance, speaking about safety, the separation of bicycle and motor vehicle lanes from pedestrian areas is a key safety measure that can significantly reduce accidents and increase perceived safety among users (Mesimäki and Luoma 2021). The separation of bicycle and motor vehicle lanes from pedestrians is the ideal condition in urban areas to ensure that all road users have the right of way and to ensure the safety and comfort of all road users (figure 6).

Figure 6
The installation of designated bike lanes

Similarly, clear markings for pedestrian areas in transit hubs like bus terminals (figure 7) are vital for user safety and efficient movement. Research shows that well-designed wayfinding systems can reduce pedestrian confusion and potential conflicts with vehicles, thereby promoting walking as a viable transport option (Hanissa et al. 2020). It is anticipated that effective implementation of this segmentation could end up in heightened cycling and walking rates in urban environments. Public spaces, including streets with bicycle lanes and pedestrian areas, are essential for encouraging active transportation and social interaction.

Figure 7
Ensuring the clearly stated marking of the pedestrian areas

Accessibility is another key factor in ensuring that public spaces can be enjoyed by all members of the community. (ERKARTAL 2020) suggest that well-designed stairs can serve as both functional and attractive elements in urban design, encouraging people to choose more active routes. On the other hand, according to the principles of universal design, open areas should have both stairs and steps (figure 8) to accommodate a variety of physical abilities and personal preferences. Pedestrian bridges that combine stairs with ramps (figure 9) are particularly beneficial for cyclists and those with mobility challenges, exemplifying how thoughtful design can make public spaces more inclusive (Štimac Grandić et al. 2024).

Figure 8
Open area with additional access in the form of stairs and steps.

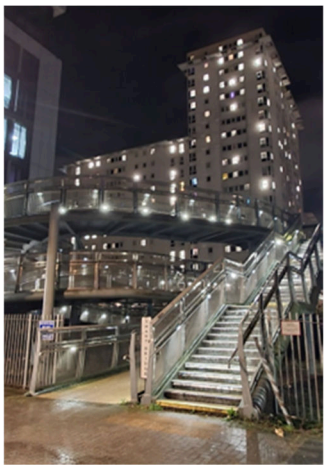

Figure 9
Crossing bridge for pedestrians and cyclists

Next, comfort in public spaces extends beyond safety to include amenities that make the space more inviting. For example, open spaces that incorporate food stalls with standing eating areas provide a unique opportunity for physical activity and social interaction. These areas encourage people to move around, explore different food options, and engage in casual dining while standing, which can contribute to increased physical activity. The provision of food stalls with standing eating areas (figure 10) can create vibrant social spaces that encourage people to spend more time outdoors. However, it's crucial the provider/food handlers with concerns about food hygienes, public health and cleanliness (Siau et al. 2015).

Figure 10
A place to eat that allows people to stand. Saves space, but is still functional

The provision of bicycle rental facilities that can be operated independently via mobile phones (figure 11) represents an innovative approach to increasing accessibility to active transportation. Such systems have been shown to increase cycling rates (Ricci 2015), particularly for short trips, contributing to overall urban mobility and health. However, it's important to consider potential issues such as digital divide and equitable access to these technologies.

Figure 11
Providing bicycle rental facilities that can be done independently

Secure and convenient bicycle parking has been identified as a significant factor in encouraging bicycle use, particularly for commuting purposes (Fernández-Heredia, Monzón, and Jara-Díaz 2014). Different types and designs of public bicycle parking, both open and closed (figure 12), are essential for supporting cycling as a viable transportation option. As the popularity of cycling for commuting continues to increase, it is crucial to enhance public spaces to accommodate this increasing mode of transportation.

Figure 12
Several types and designs of bicycle parking, both open and closed

In terms of optimising public space development, the creation of public spaces that are designed to accommodate the diverse requirements of the community and adapt to the changing seasons could encourage social interaction, exercise, and overall health throughout the year. Communal sports activities like marathons, cycling events, and fun walks (figure 13) can foster a sense of community while promoting physical activity. These events have been shown to have positive impacts on community

cohesion and individual health outcomes. However, organizers must be mindful of potential disruptions to daily life and ensure equitable access to these events. Seasonal activities such as ice-skating rinks in winter and Christmas markets (figure 14) also can transform public spaces, attracting visitors and promoting physical activity even in colder months. However, it's crucial to ensure that these seasonal adaptations don't exclude certain community members and that spaces remain accessible year-round.

Figure 13
Community engaging for sport activities

Figure 14
Winter activities in one of the cities in England

Public spaces should be designed to accommodate various requirements and seasonal variations; nonetheless, it is of utmost importance to ensure that all members of the community are able to access these spaces. Additionally, it is possible to think about integrating nature with urban design. The creation of recreation places along rivers is a great example of how to combine nature and city life. The development of river border areas for physical activities (figure 15) represents an excellent opportunity to combine natural elements with urban design. These areas can provide spaces for relaxation and exercise while also serving important ecological functions. Studies have shown that proximity to blue spaces can have significant positive impacts on mental health and well-being. However, development of these areas must be balanced with environmental conservation efforts.

Figure 15
The river border area is an area that can be developed as a public area for physical activity while enjoying the natural atmosphere and relaxing

One way that urban spaces might be multipurpose is by including play areas in shopping centre open yards (figure 16). These areas can encourage physical activity among children and families while also potentially increasing dwell time and economic activity in commercial areas. However, careful design is necessary to ensure safety and to balance the needs of different user groups. The inclusion of play areas in open yards within shopping centers provides children with spaces to be active while their parents do shop. These areas encourage physical activity among children and offer a convenient solution for parents, making shopping centers more family-friendly. Providing play areas in commercial settings could also increase the time families spend in these spaces and promote more active lifestyles for children.

In summary, the design and implementation of these various public space features require a holistic approach that considers safety, comfort, accessibility, community needs, and environmental factors. While each element can contribute to creating more active and livable urban environments, their success depends on thoughtful integration within the broader urban context and ongoing community engagement.

Figure 16
Creating a playground within a shopping center's open courtyard

Conclusions

This study has identified several key dimensions of successful active design implementation. The fundamental design principles that emerged from our analysis include: (1) Core Design Elements: (a) Ease of access and circulation (b) Safety considerations for both traffic and personal security (c) Comfort through ergonomic design principles (d) Creative elements that actively engage users in physical movement. (2) Critical Success Factors in Public-Community-Government Engagement: (a) Integration of seasonal markets and community events (b) Development of communal spotrs facilities (c) Provision of well-maintained public infrastructure (e.g., bicycle lane, pedestrian access) (d) Incorporation of pet-friendly design elements, particularly for pet-walking.

However, it is important to acknowledge that the design solutions documented in this study, particularly those for outdoor facilities, may not be directly transferable to regions with different climatic conditions, such as tropical countries. Nevertheless, these examples serve as valuable reference points that can be adapted and modified to suit local contexts. The success of active design implementation ultimately depends on careful consideration of human behavior patterns and local cultural contexts. This underscores the critical responsibility of architects, urban planners, and government bodies to develop culturally sensitive and climatically appropriate active design solutions.

Future research opportunities include: (a) Development of region-specific active design guidelines (b) Creation of climate-responsive design solutions (c) Investigation of cultural adaptation strategies (d) Longitudinal studies examining long-term health impacts (e) Assessment of community engagement effectiveness.

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