

Connecting Play: Youth and Digital Media for Urban Public Parks in Hong Kong

Lum Huey Ying., Mohd Yazid Mohd Yunos*, Shureen Faris Abd. Shukor., Roziya Ibrahim

Department of Landscape Architecture, Faculty of Design and Architecture, Universiti Putra Malaysia

DOI: <https://dx.doi.org/10.47772/IJRISS.2025.909000339>

Received: 02 September 2025; Accepted: 12 September 2025; Published: 10 October 2025

ABSTRACT

Urban park utilization among youth is declining in high-density cities such as Hong Kong, driven by increasingly sedentary lifestyles and insufficiently engaging public spaces, with significant consequences for health, well-being, and social connectedness. This study systematically reviews and synthesizes current evidence on the factors influencing youth engagement with urban public parks, with a particular focus on the integration of interactive media technologies as a strategy to revitalize park use. The objective is to identify evidence-based design and policy interventions that can enhance youth participation and promote healthy, active lifestyles. Employing a systematic literature review methodology, relevant peer-reviewed articles published between 2010 and 2024 were identified through SCOPUS and Google Scholar using the keywords "urban public park," "youth," and "interactive media technology." Forty-nine studies meeting the inclusion criteria were analyzed and thematically categorized into youth motivations and barriers, spatial equity and park design, and the application of digital technologies in park settings. Results indicate that accessible, high-quality amenities and structured programming are fundamental to attracting youth, while the integration of interactive media technologies—including mobile applications, augmented reality games, and sensor-enabled installations—shows significant potential to increase physical activity, experiential enjoyment, and social interaction among young people.

However, this review also applies a critical lens to potential drawbacks such as digital inequity, data privacy, excessive screen time, and commercialization—issues that are often underexplored. Furthermore, the proposed conceptual framework is expanded to include environmental sustainability, such as smart energy use and green infrastructure, ensuring that digitally enhanced parks contribute to broader urban resilience as well as youth well-being. The framework offers actionable guidance for urban planners and policymakers, and highlights the need for future pilot studies and comparative research to empirically validate the model and optimize health, social, and ecological outcomes for urban youth.

Keywords: Youth; Urban parks; Interactive media; Physical activity; Digital play; Social connectedness

BACKGROUND PROBLEM

In Hong Kong and comparable urban environments, youth are increasingly subject to intense academic demands and sedentary leisure preferences, including extensive engagement with video games and social media. These trends significantly restrict opportunities for outdoor play, undermining both physical fitness and social connectedness (Zhang et al., 2021; Huang et al., 2023). Notably, the 2022 Hong Kong Report Card assigned a grade of D— for adolescent physical activity, underscoring alarmingly low exercise levels (Huang et al., 2023). While these deficits are particularly pronounced in Hong Kong, similar patterns have been observed in other high-density global cities, indicating both local and international relevance.

Substantial evidence suggests that park design can play a pivotal role in addressing these challenges. High-quality sports facilities, playgrounds, and organized programming have been shown to attract teenagers and promote physical activity (Zainol & Au-Yong, 2016; Huang et al., 2019). In the specific context of Hong Kong, the usability and diligent maintenance of park amenities are critical determinants in encouraging moderate-to-vigorous physical activity (MVPA) among adolescents (Zhang et al., 2021; Chow et al., 2016). Furthermore,

neighborhood socioeconomic status moderates the impact of park safety and aesthetics on youth activity (Zhang et al., 2021).

Despite these recognized benefits, many parks continue to lack dynamic, youth-oriented features that resonate with contemporary interests. The integration of interactive media—such as mobile applications and augmented reality (AR) games—presents a promising strategy to enhance park appeal, engagement, and social experience for young people. Recent systematic reviews further emphasize that integrating interactive media in urban parks can enhance social connectedness and support the evolution of sustainable smart cities (Lum et al., 2024). However, the literature is not unanimous: while some studies report increased engagement and activity, others note only temporary novelty effects or even the risk of increased screen time replacing genuine outdoor play (Lin et al., 2020; Geng et al., 2021). This review therefore introduces the Youth Interactive Media Park framework, which strategically combines natural play environments with digital features to motivate outdoor activity and foster healthier, more connected urban lifestyles—while critically considering the broader implications and sustainability of such interventions.

RESEARCH METHODOLOGY

The literature review employed in this paper follows the "systematic literature review synthesis process" (Masiran et al., 2019; Luo et al., 2022; Zou et al., 2023). This approach enables a structured and independent review of the field, establishing a robust theoretical context during the early conceptualization phase (Rousseau et al., 2008; Yu Xiao & Maria Watson, 2019; Templier & Paré, 2015).

Utilizing Ibrahim's research question (RQ) construct classification, we identified three constructs: "WHO" (the element impacted by the research), "WHAT" (the information needed to solve the problem), and "HOW" (the targeted impact of the study), thereby formulating the primary research questions (Ibrahim, 2008; 2011; 2020).

A bibliographic search was conducted in SCOPUS and Google Scholar using the keywords: urban public park, youth, and interactive media technology. Forty-nine peer-reviewed articles and abstracts were selected after thorough title and abstract reviews. The main content and conclusions of these articles were analyzed to assess their relevance and identify areas requiring further strengthening, including contradictory or context-dependent findings. The selected abstracts were categorized into specific sub-themes: youth motivations and barriers; spatial equity and park design; and digital technologies in park settings. The review included a cross-analysis of integrated possibilities and prioritization of synthesized information to propose a high-probability theoretical framework for future urban public park designs. The entire review process was documented using the online EAGLE System.

The review sample, while robust for an initial synthesis, may not fully capture the global breadth of research, particularly studies in other languages or from underrepresented contexts. Therefore, the findings and framework should be understood as a foundation for future research and adaptation in varied socio-cultural settings.

Youth, Urban Public Park, And Interactive Media Technology

Youth

Motivations and Preferences for Park Use

Youth engagement in urban public parks is shaped by a combination of personal motivations and environmental attributes. Young people are attracted to parks for outdoor experiences, sports, social interaction, and the use of well-maintained facilities (Zainol & Au-Yong, 2016). Accessibility, diversity, and quality of amenities are fundamental determinants of visitation frequency and activity intensity. Involving youth in park design and programming enhances relevance and engagement (Veitch et al., 2020; Gallerani et al., 2016). However, despite these opportunities, physical activity among Hong Kong youth remains low, reflecting a persistent gap between the potential of urban parks and their actual utilization (Huang et al., 2019).

Barriers to Youth Engagement and Physical Activity

Multiple barriers continue to impede youth participation in park activities. These include academic demands, a preference for sedentary screen-based entertainment, limited awareness of recreational programs, low intrinsic motivation, and reduced self-efficacy (Zhang et al., 2021; Huang et al., 2023; Sandu et al., 2018). Socioeconomic status shapes the impact of park safety and aesthetics, with youth from lower-income neighborhoods often facing greater challenges. Notably, while some digital interventions have led to increased park activity, several studies reveal that such effects are often short-lived or unevenly distributed, particularly where digital access is limited or where interventions are not paired with broader social supports (Lin et al., 2020; Geng et al., 2021).

Digital and Social Influences on Youth Park Engagement

Digital and social influences are central to shaping youth attitudes and behaviors regarding park use. Social media platforms serve as important arenas for sharing fitness routines and park experiences, amplifying peer influence and expanding reach (Li et al., 2022). The integration of digital strategies—such as interactive media features and online campaigns—into park planning represents a promising avenue for engagement, but research is inconsistent regarding which strategies are most effective or equitable. More targeted, comparative research is needed to identify digital interventions that promote sustained, inclusive youth participation.

Urban Public Parks

Spatial Equity and Accessibility

Spatial equity and accessibility are critical to ensuring that urban parks support youth engagement, particularly in compact and densely populated cities. The distribution of parks is often uneven, with lower-income districts facing deficits in both the quantity and quality of green spaces (Zhang et al., 2021). Proximity does not guarantee access; barriers such as inadequate transportation links, urban fragmentation, and safety concerns can restrict regular park use, especially for marginalized youth. Perceived safety, convenience, and inclusiveness are as important as geographic distance (Veitch et al., 2020). Gender and cultural factors further mediate access, highlighting the need for adaptive, context-sensitive planning.

Quality, Design, and Functionality of Park Amenities

The design and functionality of park amenities significantly influence youth engagement. Well-designed parks provide a range of facilities—including sports courts, playgrounds, open lawns, and shaded seating—that accommodate diverse youth interests (Zainol & Au-Yong, 2016). Clean, safe, and well-maintained amenities are consistently cited as key drivers of positive park experiences. Involving youth in design and assessment processes leads to more relevant, engaging park environments (Gallerani et al., 2016). Conversely, a lack of age-appropriate equipment, poor maintenance, or inflexible features can be significant deterrents, especially in aging or under-resourced parks (Veitch et al., 2020). Inclusive and adaptive design, universal access, gender-sensitive facilities, and opportunities for social interaction foster a sense of belonging and safety. Importantly, some studies caution that overemphasis on digital features may inadvertently detract from unstructured play and face-to-face socialization if not balanced with traditional amenities.

Interactive Media Technologies

Digital Interventions for Promoting Physical Activity

The integration of interactive media technologies into urban parks has gained scholarly and practical interest as a potential remedy for declining youth activity. Digital interventions—such as exergames, location-based mobile applications, and augmented reality experiences—are designed to bridge sedentary digital habits and active outdoor engagement (Li et al., 2022). These technologies can transform park visits into immersive, game-like experiences that incentivize movement and exploration. While AR games like Pokémon GO have demonstrated increases in physical activity and park visitation, some studies indicate these effects are often temporary, with engagement declining as novelty wears off (Lin et al., 2020). In some contexts, digital interventions may even

unintentionally increase screen time or deepen exclusion for youth without access to technology (Geng et al., 2021; Wang et al., 2024).

Social Connectivity and Peer Engagement

Interactive media can foster social connectivity and peer engagement, transforming physical activity from an individual pursuit into a shared, community-driven experience. Social media platforms, digital challenges, and collaborative gaming experiences enable youth to share park-based activities, participate in group competitions, and build online communities (Li et al., 2022). Real-time feedback, leaderboards, and achievement badges can encourage friendly competition and sustained involvement. However, balancing digital engagement with meaningful face-to-face interactions and unstructured play is essential, as excessive reliance on digital tools may undermine social and developmental benefits.

Implementation Challenges, Ethical Risks, and Environmental Sustainability

Despite their promise, interactive media technologies also present substantial challenges and ethical considerations. The digital divide remains a major concern, as disparities in access to devices, connectivity, and digital literacy may exclude marginalized youth (Wang et al., 2024). Data privacy and security are paramount, particularly when collecting personal or locational data from minors (Zeng et al., 2023). Over-dependence on technology risks increased screen time, potentially undermining physical activity goals. Commercialization of public spaces—through branded content or in-app purchases—can shift the focus from community well-being to private gain. Finally, environmental sustainability must be addressed: digital installations can increase energy consumption and electronic waste if not managed responsibly.

The proposed Digitally Transformed Youth Park framework is therefore expanded to explicitly integrate environmental sustainability, including the use of smart energy systems (e.g., solar-powered installations), incorporation of green infrastructure (such as rain gardens and native plantings), and strategies to minimize electronic waste. This ensures that digitally enhanced parks not only attract youth but also contribute to urban resilience and ecological stewardship.

DISCUSSIONS

This review highlights the persistent challenges of youth engagement in urban parks within high-density contexts such as Hong Kong. While accessibility, safety, and high-quality amenities are foundational, these alone are insufficient to counteract the influence of digital, sedentary lifestyles. The findings confirm that youth participation increasingly depends on strategies that align with evolving digital habits, social preferences, and broader equity and sustainability goals.

A key contribution of this review is the synthesis of three interconnected domains: youth motivations and barriers, spatial equity and park design, and the application of interactive media technologies. The review critically evaluates not only the opportunities but also the risks and contradictions of digital interventions. Not all interactive media initiatives sustain engagement or physical activity long-term; some lead to only temporary gains or exacerbate digital and social inequities. Risks related to privacy, commercialization, and environmental impact are often underexplored and require explicit attention in both research and practice.

The expanded Digitally Transformed Youth Park framework moves beyond treating technology as an add-on, positioning it as a core—yet not exclusive—component of the park ecosystem. The framework emphasizes participatory co-design, digital equity, robust privacy safeguards, and environmental sustainability. While the Hong Kong context grounds the review, many findings are relevant to other global cities, though adaptation to local conditions and further empirical validation are needed.

Contradictory Findings and Contextual Differences

Although interactive media technologies such as augmented reality games, exergames, and mobile applications demonstrate potential to increase youth physical activity and park visitation, evidence across studies is far from consistent. Some research shows substantial short-term increases in engagement and social interaction following

interventions like Pokémon GO, yet other studies indicate that these effects decline once the novelty wears off. Contextual factors—including cultural expectations, socioeconomic status, gender, and program design—appear to strongly influence whether digital interventions lead to sustained benefits. This inconsistency highlights that technology alone cannot guarantee long-term behavioral change. Instead, digital features should be combined with structured programming, participatory co-design, and ongoing community engagement to maximize sustainability and inclusivity.

Sustainability Considerations

Another critical but often overlooked dimension is environmental sustainability. While digital enhancements can revitalize park experiences, they also risk higher energy consumption, increased maintenance demands, and electronic waste. To ensure that technology-driven parks contribute positively to urban resilience, interactive features should be planned in tandem with sustainable infrastructure. Examples include solar-powered or energy-efficient installations, green infrastructure such as rain gardens and native plantings, and the use of recyclable or modular digital equipment. Embedding these practices in park planning not only mitigates ecological impacts but also aligns digital transformation with broader smart city and sustainability goals.

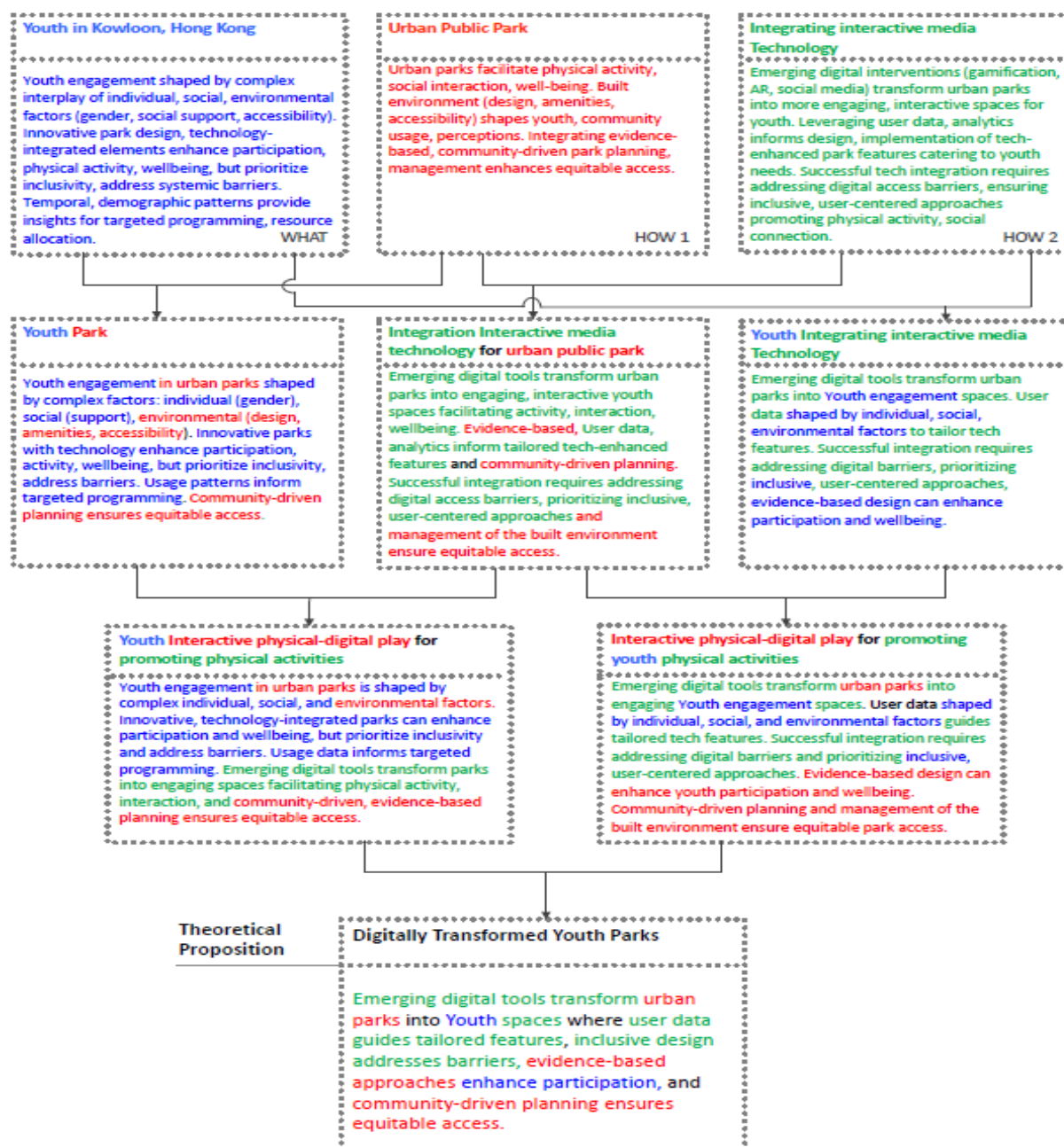


Figure 1. The Point of Departure (POD) Tree Diagram for Digitally Transformed Youth Parks. (Ying, 2025)

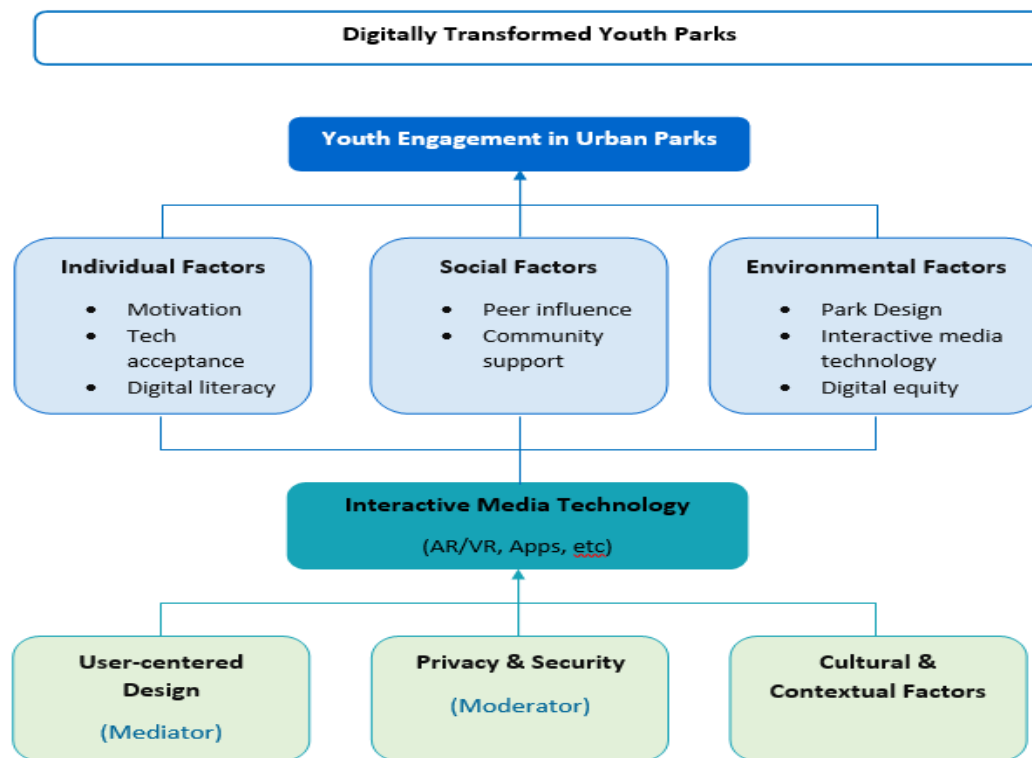


Figure 2. Illustrates the proposed conceptual framework for Digitally Transformed Youth

CONCLUSIONS

This systematic review advances understanding of youth engagement in urban public parks by synthesizing evidence on the interplay between park design, interactive media technologies, and health-promoting behaviors in high-density settings such as Hong Kong. The findings underscore that while accessible, well-maintained park amenities and organized programs are foundational for youth participation, these alone are insufficient to counteract the effects of digital lifestyles and sedentary behaviors. Integrating interactive media—such as mobile applications, augmented reality games, and sensor-enabled play—offers a promising but complex strategy to enhance youth motivation, physical activity, and social connectedness, provided these tools are deployed ethically, equitably, and sustainably.

The expanded Digitally Transformed Youth Park framework offers actionable guidance for urban planners and policymakers by advocating a synthesis of physical infrastructure, digital user-centered interventions, robust privacy and equity measures, and environmentally sustainable practices. However, this review is limited by its focus on published English-language literature and its emphasis on the Hong Kong context. The proposed framework has yet to be empirically validated in diverse real-world settings, and the long-term impacts of interactive media on youth and the environment remain uncertain.

Future research should focus on piloting the Digitally Transformed Youth Park model in diverse urban contexts, employing participatory, longitudinal, and comparative approaches. Rigorous evaluation of effectiveness, inclusivity, sustainability, and ethical implications—including privacy, digital inclusion, and environmental impact—will be essential to ensure that technology-enhanced parks remain responsive to the evolving needs of urban youth and contribute to broader urban resilience goals.

Global Applicability

Although this review situates Hong Kong as the primary case study, the findings hold broader relevance for other high-density cities such as Singapore, Seoul, Tokyo, and Barcelona, where limited open space, academic pressure, and pervasive digital lifestyles similarly shape youth behavior. The proposed Digitally Transformed Youth Park framework can be adapted to diverse cultural and socio-economic settings, provided that local

governance structures, equity concerns, and community needs are carefully considered. By positioning Hong Kong as a representative case, this study highlights both the local importance and the global transferability of technology-enhanced park models.

Policy Implications

From a policy perspective, the framework should not be treated as an isolated design idea but as part of wider urban development strategies. Integrating interactive park technologies into existing smart city agendas, health promotion programs, and green infrastructure initiatives would ensure that digital interventions support not only youth engagement but also broader goals of public health, social inclusion, and environmental sustainability. Such alignment strengthens the ability of digitally transformed parks to function as resilient, inclusive, and future-ready public spaces.

ACKNOWLEDGEMENTS

This study is a part of the first author's PhD study at Universiti Putra Malaysia. The author would like to thank Mohd Yazid Mohd Yunos, Shureen Faris Abd. Shukor, and Roziya Ibrahim for their contributions to this study.

REFERENCE

1. Adlakha, D., Budd, E. L., Gernes, R., Sequeira, S., Hipp, J. A., & Brownson, R. C. (2014). Use of emerging technologies to assess differences in outdoor physical activity in St. Louis, Missouri. *Frontiers in Public Health*, 2, 41. <https://doi.org/10.3389/fpubh.2014.00041>
2. Alotaibi, M., Alnajjar, F., Khalid, S., & Alharthi, M. (2020). The relationship between technology use and physical activity among typically-developing children. *Healthcare*, 8(1), 11. <https://doi.org/10.3390/healthcare8010011>
3. Babey, S. H., Hastert, T. A., Yu, H., & Brown, E. R. (2008). Physical activity among adolescents: When do parks matter? *American Journal of Preventive Medicine*, 34(4), 345–348. <https://doi.org/10.1016/j.amepre.2008.01.020>
4. Baran, P. K., Smith, W. R., Moore, R. C., Floyd, M. F., Bocarro, J. N., Cosco, N. G., & Danninger, T. M. (2014). Park use among youth and adults: Examination of individual, social, and urban form factors. *Environment and Behavior*, 46(6), 768–800. <https://doi.org/10.1177/0013916512470134>
5. Bopp, T., & Stellefson, M. (2020). Practical and ethical considerations for schools using social media to promote physical literacy in youth. *International Journal of Environmental Research and Public Health*, 17(4), 1220. <https://doi.org/10.3390/ijerph17041220>
6. Chan, J. K. H., & Leung, M. Y. (2022). Sustainable built environment for facilitating public health of older adults: Evidence from Hong Kong. *Sustainable Development*, 30(3), 446–458. <https://doi.org/10.1002/sd.2255>
7. Chang, H. Y., Song, Y., & Li, Q. (2019). Public transportation and the spatial inequality of urban park accessibility: New evidence from Hong Kong. *Transportation Research Part D: Transport and Environment*, 76, 102765. <https://doi.org/10.1016/j.trd.2019.102765>
8. Chow, B. C., McKenzie, T. L., & Sit, C. H. P. (2016). Public parks in Hong Kong: Characteristics of physical activity areas and their users. *International Journal of Environmental Research and Public Health*, 13(7), 639. <https://doi.org/10.3390/ijerph13070639>
9. Diehl, G. M., Schooley, P., Turner-McGrievy, B., Wilcox, S., Stanis, S. A. W., Kaczynski, A. T., & Hipp, J. A. (2016). Development and testing of mobile technology for community park improvements: Validity and reliability of the eCPAT application with youth. *Translational Behavioral Medicine*, 6(4), 593–602. <https://doi.org/10.1007/s13142-016-0452-5>
10. Duan, Y., Tam, N. L., Clark, A. F., Wang, Y., Yang, Y., Lu, Y., & Ma, J. (2018). Physical activity areas in urban parks and their use by the elderly from two cities in China and Germany. *Landscape and Urban Planning*, 178, 261–273. <https://doi.org/10.1016/j.landurbplan.2018.06.009>
11. Elsayed, A., & Ashrry, N. (2020). A proposed model for measuring the performance of smart public parks. *Engineering Research Journal*, 43(1), 1–7.

12. Floyd, M. F., Bocarro, J. N., Smith, W. R., Baran, P. K., Moore, R. C., Cosco, N. G., Edwards, M. B., Suau, L. J., & Fang, K. (2011). Park-based physical activity among children and adolescents. *American Journal of Preventive Medicine*, 41(3), 258–265. <https://doi.org/10.1016/j.amepre.2011.06.013>
13. Gallerani, D. G., Besenyi, G. M., Stanis, S. A. W., & Kaczynski, A. T. (2016). "We actually care and we want to make the parks better": A qualitative study of youth experiences and perceptions after conducting park audits. *Preventive Medicine*, 95, S20–S25. <https://doi.org/10.1016/j.ypmed.2016.11.014>
14. Geng, D. C., Innes, J., Wu, W., & Wang, G. (2021). Promoting social interaction and play through digital media in urban parks: Evidence from China. *Urban Studies*, 58(12), 2491–2510. <https://doi.org/10.1177/0042098020950496>
15. Huang, W. Y., Wong, S. H. S., Sit, C. H. P., Wong, M. C. S., Sum, R. K. W., Wong, S. W. S., & Yu, J. (2019). Results from the Hong Kong's 2018 report card on physical activity for children and youth. *Journal of Exercise Science & Fitness*, 17(1), 8–13. <https://doi.org/10.1016/j.jesf.2019.01.002>
16. Huang, W. Y., Wong, S. H. S., Sit, C. H. P., Wong, M. C. S., Wong, S. W. S., & Ho, R. S. T. (2023). Results from the Hong Kong's 2022 report card on physical activity for children and adolescents. *Journal of Exercise Science & Fitness*, 21(1), 45–51. <https://doi.org/10.1016/j.jesf.2022.10.010>
17. Ibrahim, R. (2008). Setting up a research question for determining the research methodology. *Alam Cipta International Journal on Sustainable Tropical Design Research and Practice*, 3(1), 69–72.
18. Ibrahim, R. (2011). Demystifying the arduous doctoral journey: The EAGLE vision of a research proposal. *The Electronic Journal of Business Research Methods*, 9(2), 130–140. <https://doi.org/10.34190/EJBRM.9.2.131>
19. Jerrett, M., Almanza, E., Davies, M., Wolch, J., Dunton, G., Spruijt-Metz, D., & Pentz, M. A. (2013). Smart growth community design and physical activity in children. *American Journal of Preventive Medicine*, 45(4), 386–392. <https://doi.org/10.1016/j.amepre.2013.05.010>
20. Kamel Boulos, M. N., Lou, R. C., Anastasiou, A., & Nugent, C. D. (2021). Digital interventions and gamification for promoting physical activity in urban parks. *International Journal of Health Geographics*, 20, 12. <https://doi.org/10.1186/s12942-021-00290-6>
21. Koivisto, J., Malik, A., & Hamari, J. (2021). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, 57, 102248. <https://doi.org/10.1016/j.ijinfomgt.2020.102248>
22. Lai, P. C., & Low, C. L. (2019). Provision of convenient play space in a densely populated city. *International Journal of Environmental Research and Public Health*, 16(22), 4491. <https://doi.org/10.3390/ijerph16224491>
23. Li, J., Li, X., Yuan, S., & Mo, L. (2022). Using social media to understand web-based social factors concerning obesity: Systematic review. *JMIR Public Health and Surveillance*, 8(1), e28714. <https://doi.org/10.2196/28714>
24. Li, J., Theng, Y.-L., & Foo, S. (2022). Virtual reality in urban green spaces: Engagement and health outcomes among youth. *Landscape and Urban Planning*, 215, 104243. <https://doi.org/10.1016/j.landurbplan.2021.104243>
25. Lin, Y.-L., Chang, K.-C., & Lin, Y.-C. (2020). The impact of Pokémon GO on physical activity and social interaction: A systematic review. *Computers in Human Behavior*, 112, 106480. <https://doi.org/10.1016/j.chb.2020.106480>
26. López-Pernas, S., Gordillo, A., Barra, E., & Quemada, J. (2022). Evaluating the effectiveness of AR and VR for physical activity promotion: A systematic review. *Computers & Education*, 184, 104507. <https://doi.org/10.1016/j.compedu.2022.104507>
27. Lum, H. Y., Shureen, F. A. S., Ibrahim, R., & Mohd Yunos, M. Y. (2024). Integrating interactive media for social connectedness at urban public parks in sustainable smart cities: A systematic review. *International Journal of Academic Research in Business and Social Sciences*, 14(10), Article 22979. <https://doi.org/10.6007/IJARBS/v14-i10/22979>
28. McCormack, G. R., Patterson, M., Rock, M., & Lorenzetti, D. L. (2022). The association between the built environment and intervention-facilitated physical activity: A narrative systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 19, 124. <https://doi.org/10.1186/s12966-022-01373-6>
29. Milne, E., Hall, J., & Thompson, L. (2022). Inclusive play through digital design: Interactive media in public parks. *Cities*, 120, 103456. <https://doi.org/10.1016/j.cities.2021.103456>

30. Mohebi, S., Azadbakht, L., Feizi, A., Sharifirad, G., & Hozori, M. (2018). Effect of electronic education based on health promotion model on physical activity in diabetic patients. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 12(1), 39–43. <https://doi.org/10.1016/j.dsx.2017.08.012>
31. Naslund, J. A., Aschbrenner, K. A., Araya, R., Marsch, L. A., Unützer, J., Patel, V., & Bartels, S. J. (2021). Quality social connection as an active ingredient in digital interventions for young people with depression and anxiety: Systematic scoping review and meta-analysis. *Journal of Medical Internet Research*, 23(12), e23485. <https://doi.org/10.2196/23485>
32. Piras, E. M., Rizzo, A., & Di Matteo, R. (2022). User-centered design of smart playgrounds: Lessons from Italian cities. *Sustainable Cities and Society*, 86, 104352. <https://doi.org/10.1016/j.scs.2022.104352>
33. Prochnow, T., Lee, S., & McLoughlin, G. (2022). I play, you play, we play: Concurrent activity at play streets. *Research Quarterly for Exercise and Sport*, 93(1), 152–162. <https://doi.org/10.1080/02701367.2021.1951390>
34. Rashid, O., Mullins, I., Coulton, P., & Edwards, R. (2021). Interactive public displays in urban parks: Enhancing youth engagement with location-based games. *Smart Cities*, 4(2), 245–262. <https://doi.org/10.3390/smartcities4020015>
35. Rehm, M., Stevens, R., & Bischof, W. (2022). AI-driven personalization in public park installations. *Computers, Environment and Urban Systems*, 92, 101790. <https://doi.org/10.1016/j.compenvurbsys.2021.101790>
36. Rossi, F., Zancanaro, M., & Mazzone, E. (2023). Mixed reality for playful engagement in urban green spaces. *Personal and Ubiquitous Computing*, 27, 123–139. <https://doi.org/10.1007/s00779-022-01676-3>
37. Sandu, P., Chereches, R. M., Baba, C. O., Revnic, R. N., Mocean, F., & Pop, S. (2018). Environmental influences on physical activity: Romanian youths' perspectives. *Children and Youth Services Review*, 95, 253–261. <https://doi.org/10.1016/j.childyouth.2018.10.025>
38. Takemi, S., Foster, J., Frazier, M. N., Neville, O., & Billie, G. (2010). Associations between recreational walking and attractiveness, size, and proximity of neighborhood open spaces. *American Journal of Public Health*, 100(9), 1752–1757. <https://doi.org/10.2105/AJPH.2009.182006>
39. Tong, H. L., & Laranjo, L. (2018). The use of social features in mobile health interventions to promote physical activity: A systematic review. *npj Digital Medicine*, 1, 43. <https://doi.org/10.1038/s41746-018-0051-7>
40. Torres, P. E., Ulrich, P. I., Cucuiat, V., Cukurova, M., De la Presa, M. C., Luckin, R., Carr, A., Durrant, A., Vines, J., Lawson, S., & Dylan, T. (2021). A systematic review of physical–digital play technology and developmentally relevant child behaviour. *International Journal of Child-Computer Interaction*, 30, 100342. <https://doi.org/10.1016/j.ijcci.2021.100342>
41. Tucker, P., Irwin, J. D., Gilliland, J., He, M., Larsen, K., & Hess, P. (2009). Environmental influences on physical activity levels in youth. *Health & Place*, 15(1), 357–363. <https://doi.org/10.1016/j.healthplace.2008.05.003>
42. Veitch, J., Salmon, J., Deforche, B., Ghekiere, A., Van Cauwenberg, J., Van Holle, V., & De Bourdeaudhuij, I. (2020). Children's ratings of park features that encourage park visitation, physical activity and social interaction. *Urban Forestry & Urban Greening*, 53, 126702. <https://doi.org/10.1016/j.ufug.2020.126702>
43. Wang, S., Zhang, Y., & Yu, H. (2024). Digital equity in smart park initiatives: A review of barriers and solutions. *Journal of Urban Technology*, 31(1), 55–74. <https://doi.org/10.1080/10630732.2023.2189511>
44. Xu, Z., Wang, M., & Lee, Y. (2023). Immersive technologies for urban park engagement: A youth perspective. *Urban Forestry & Urban Greening*, 80, 127756. <https://doi.org/10.1016/j.ufug.2023.127756>
45. Zainol, N. R., & Au-Yong, C. P. (2016). What brings youth to recreational parks? *Planning Malaysia*, 14(1), 11–20. <https://doi.org/10.21837/pmjournal.v14.i5.191>
46. Zeng, H., Lin, Z., & Fung, L. (2023). Addressing privacy and security in interactive urban parks. *Sustainable Development*, 31(2), 310–324. <https://doi.org/10.1002/sd.2438>
47. Zhang, Q., Zhao, Y., Wang, X., & Chen, H. (2023). Effectiveness of interactive media interventions on physical activity: A meta-analysis of community-based studies. *Health & Place*, 81, 102930. <https://doi.org/10.1016/j.healthplace.2023.102930>
48. Zhang, R., Zhang, C., Lai, P. C., & Kwan, M. (2022). Park and neighbourhood environmental characteristics associated with park-based physical activity among children in a high-density city. *Urban Forestry & Urban Greening*, 68, 127471. <https://doi.org/10.1016/j.ufug.2022.127471>

-
49. Zhang, R., Zhang, C. Q., Lai, P. C., & et al. (2021). Park environment and moderate-to-vigorous physical activity in parks among adolescents in a high-density city: The moderating role of neighbourhood income. *International Journal of Health Geographics*, 20, 35. <https://doi.org/10.1186/s12942-021-00289-7>
 50. Zhang, Y., Xu, S., & Liu, Y. (2022). Evolving norms: Social media data analysis on parks and greenspaces perception changes before and after the COVID-19 pandemic using a machine learning approach. *Scientific Reports*, 12, Article 16265. <https://doi.org/10.1038/s41598-022-19685-5>