Walking in an unwalkable context: exploring methodology for co-producing knowledge in secondary cities

Prince Kwame Odame[1]*, Enoch F. Sam[1], Chinebuli Uzondu[2], Festival Godwin Boateng[3],
Emmanuel Mogaji[4], Christopher Ikeogu[2]

pkwameodame@uew.edu.gh*

University of Education, Winneba, Ghana[1]
Federal University of Technology Owerri, Nigeria[2]
University of Oxford, UK[3]
Keele University, UK[4]

Accepted 22 November 2025

1 Introduction

Walking has distinct implications across different global regions, especially between Low-Middle Income Countries (LMIC) and High-Income Countries (HIC). In HICs, walking is promoted as a preferred transportation option because of its health, economic, and environmental benefits, with residents favouring walkable neighbourhoods (Sam et al., 2024). Conversely, in many African cities, walking is the main mode of transport for 50% to 90% of the population, often because it is affordable and does not require significant infrastructure changes (Uzondu & Etika, 2022). Despite the absence of walkable infrastructure in various African cities, there is increasing pressure to prioritise walking in urban planning across Africa, with secondary cities like Cape Coast and Owerri presenting opportunities to incorporate pedestrian-friendly solutions from the beginning.

However, existing methodologies for assessing walkability often depend on static measurements and questionnaires, which may overlook important contextual factors. To address this gap, co-producing knowledge through collaborative research with stakeholders emerges as a promising approach. This participatory method empowers marginalised groups, aligning academic insights with real-world needs. This study aims to improve walkability research by incorporating participatory techniques, post-walk interviews, and eyeglass walk footage that captures pedestrian experiences more thoroughly. This approach enhances understanding of the motivations behind walking behaviours and tackles the limited research on walkability in secondary African cities. The findings will aid in policy development favouring sustainable urban transportation options.

2 Methodology (Techniques, processes and actors involved)

Collaborative efforts to understand pedestrian mobility require an inclusive strategy that considers diverse pedestrian physical abilities, economic backgrounds, and gender, involving various stakeholders. To foster a shared sense of ownership, research teams from Ghana and Nigeria conducted reconnaissance visits to Cape Coast and Owerri, respectively. During these visits, each team took the opportunity to investigate and observe the study areas while engaging with potential stakeholders to gather insights on pedestrian experiences and infrastructure conditions within their communities.

Through these activities, the teams collected valuable insights into stakeholders' mobility needs, forming the foundation for developing a draft agenda for a formal project inception meeting. Additionally, photos of various walking conditions in the sites were taken by project members and used as key resource materials in subsequent meetings.

The methodological protocols described here were reviewed and approved by the Federal University of Technology, Owerri (FUTO) Research Ethics Committee (reference: SMAT/REC/01/2023). This was particularly useful since the use of eyeglasses in public spaces raises privacy concerns, which were addressed by limiting the study to public areas where people do not have reasonable expectations of privacy. Faces and vehicle registration numbers were also blurred to ensure anonymity.

2.1 Survey Research instruments and actors involved.

The development of a survey instrument was guided by stakeholders' engagements and a literature review on walkability. The survey was conducted using KoboCollect, targeting respondents aged 18 and above who walk an average of 15 minutes per day, aligning with the "15-minute city" concept as cited by Baig et al., (2025). A total of 450 respondents were engaged per study site, exceeding the recommended sample sizes for Cape Coast (189,925) and Owerri (229,515), to enhance the study's predictive power. Local guides, including opinion leaders and youth leaders, facilitated community entry, respondent identification and data collection. Using the random walk technique, data were collected in high-traffic areas, such as markets/churches. Here, the first eligible respondent was chosen randomly, followed by every third respondent along key routes. This method, recommended by Flynn et al. (2013), ensured accurate population representation while maintaining data reliability. The questionnaire took an average of 25 minutes, and some surveys in Ghana were conducted in local dialects (e.g., Fanti) to improve communication.

The quantitative data identified common factors influencing perceptions of walking quality in Cape Coast and Owerri, despite some variations in the level of agreement. In both cities, walking remains a primary mode of transport, accounting for over 60% of all trips. Data analysis (see Appendix A) showed that a sense of security continued to be a major concern affecting commuters' perception of walking in both cities. Respondents highlighted issues such as *"There are other commuters on the route I use when walking during the day"* (Cape Coast - M = 3.76) and *"There are threats of attack from unknown people while walking at night"* (Owerri - M = 3.59). Among the 14 safety indicators, two were particularly influential: *"Pedestrians and cars compete for access to mobility spaces (Figure 2A)"* (Cape Coast - M = 4.35; Owerri - M = 3.4), and *"There are parked vehicles, and other obstructions that hinder the use of sidewalks in my community (Figure 2B)"* (Cape Coast - M = 3.68; Owerri - M = 3.34). Regarding convenience, assessed through 11 items, respondents from both Cape Coast (M = 2.97) and Owerri (M = 3.05) considered a flat, level walking surface essential. For attractiveness, Owerri respondents valued an engaging and visually appealing environment (M = 3.35), while Cape Coast respondents associated obstructions (M = 2.99) with a reduced sense of attractiveness.

Figure 1: Walking conditions in the study sites
A = Market routes with no sidewalks
B = Sidewalks with path obstructions

The qualitative approach used two methods to thoroughly understand walkability and pedestrian experiences in the selected cities. The first was the "Eyeglass Walk," where participants wore eyeglasses with video recorders to capture their 15-minute walks along pre-approved routes, ranging from areas with walking infrastructure to those without. These routes included frequently used pedestrian zones, such as marketplaces, schools, and other key locations, allowing for an in-depth analysis of pedestrian activity. Unlike traditional walkability studies that rely on surveys or field mapping (Forsyth, 2015), the eyeglass videos offered direct visual evidence of pedestrians' challenges and concerns, making them essential for building public support and attracting stakeholder attention to improving walking conditions. Nineteen participants took part in this activity: nine from Cape Coast (five males, four females) and ten from Owerri (six males, four females), with an average age ranging from 36 to 47 years. Following the "Eyeglass Walk," participants immediately engaged in post-walk interviews to discuss walking path safety, challenges encountered with the glasses, interactions with road users, and whether the recording equipment influenced their behaviour. These discussions provided valuable qualitative insights into urban walkability, highlighting the urgent need for enhanced pedestrian infrastructure in both cities.

The video recordings revealed dynamic, context-specific interactions that static survey responses could not fully capture. Unlike questionnaire-based studies, which often rely on recall and subjective reporting, the Eyeglass Walk provided direct, real-world evidence of pedestrian challenges. For example, the videos documented unexpected obstacles, such as aggressive vehicular encroachment, informal vendor blockages, and real-time pedestrian navigation strategies, which respondents might not have explicitly mentioned in a survey. Furthermore, the footage illustrated how participants adapted to inadequate walking infrastructure, which is difficult to quantify but crucial for urban planning interventions. Additionally, the videos captured participants' emotional

and behavioural responses to their walking environments, including hesitations at unsafe crossings, reactions to poor signage, and interactions with other road users. This unfiltered documentation of pedestrian experiences deepens the understanding of mobility barriers beyond what self-reported data alone could provide.

The Eyeglass Walk footage served as both a valuable research tool and a powerful advocacy resource. Unlike survey statistics, which can seem abstract, video evidence offers a compelling narrative that policymakers, urban planners, and the general public can easily relate to visually. This tangible depiction of pedestrian struggles fosters empathy and a sense of urgency, making it easier to advocate for policy changes and infrastructure enhancements. Additionally, videos act as an engagement tool for a wide range of stakeholders, including local authorities, community leaders, and advocacy groups. When combined with quantitative data, they present a comprehensive case for investing in pedestrian infrastructure. In Cape Coast, for example, participants highlighted the lack of effective advocacy for walking infrastructure, and these video insights provide concrete evidence to support such campaigns. In Owerri, where safety concerns dominated pedestrian discussions, visual documentation of safety risks could motivate authorities to take action.

3 Implications and Limitations

The study is notable for its innovative use of eyeglasses to improve walkability data collection. This distinctive approach empowered respondents by providing a distraction-free, immersive method for gathering data. It also offered a new way to document pedestrian experiences, leading to two major outcomes: better data collection and increased community engagement. One significant result of the study is the development of a repository of videos capturing pedestrian concerns about walking infrastructure in the study areas. These videos offer an inventive storytelling method, adding depth to the research and showcasing the potential of technology to amplify community voices.

Nevertheless, the study recognises possible limitations. Participants' socio-cultural and political biases regarding walking as a transport mode or its safety perceptions could affect the results. For instance, residents might misunderstand walking in relation to the researchers' perspective, politicise local authorities' initiatives, or mistrust the research process. To address these issues, the study employed a co-production approach that promoted shared ownership and trust. Participants actively contributed to survey design and discussions on the topic, ensuring ideas were aligned and minimising the risk of suggestive language that could bias responses.

4 Conclusion: Directions for future research

This study draws on pedestrians' experiences to generate knowledge by exploring walking in secondary cities. It employs various techniques, including digital innovation such as eyeglasses with a concealed camera and microphone, allowing participants to record their walking experiences in real life without distraction. The methodology was participatory, positioning participants as valuable co-creators of knowledge while recognising their needs and aspirations. The paper emphasises the vital role of walking in providing access

to diverse life-enhancing opportunities. However, a gap remains between policymakers' interventions on walking and the actual needs of pedestrians, as the study's methodology produced contrasting outcomes for both groups.

5 Recommendations

The authors suggest expanding this research method to include vulnerable populations. This would offer a more inclusive understanding of walkability challenges from the perspectives of those facing greater mobility restrictions. By incorporating their experiences, future studies could produce a more comprehensive dataset that highlights disparities in walkability across different demographic groups.

6 Ethics declarations

The School of Management Technology approved the research protocol, Federal University of Technology Owerri (FUTO) Research Ethics Committee (reference: SMAT/REC/01/2023).

7 CRediT authorship contribution statement

Prince Kwame Odame: Writing – original draft, Resources, Methodology, Funding acquisition, Conceptualization. **Enoch F. Sam:** Writing – original draft, Methodology, Investigation, Conceptualization. **Chinebuli Uzondu:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization. **Festival Godwin Boateng:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization. **Emmanuel Mogaji:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Christopher Ikeogu:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization.

8 Informed consent

Informed consent was obtained from all individual participants included in the study.

9 Funding

This work was funded by Volvo Research and Educational Foundations (VREF) [EP-2022-WK-08].

10 Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

11 Acknowledgements

We appreciate the commitment and efforts of the city planners from Cape Coast and Owerri, as well as academics, community leaders, and residents. ChatGPT 4.0 was used to summarise and improve language in some portions of the manuscript.

12 Appendix A

Mean scores and standard deviations for items that influence pedestrians' perception of the quality of their walking experience in Cape Coast and Owerri.

	Mean (M)	Standard Deviation (SD)

Constructs/Indicators	Cape Coast	Owerri	Cape Coast	Owerri
Sense of safety				
Pedestrians and cars compete for access to spaces	4.35	3.34	1.071	1.125
I feel safe crossing the road	2.63	2.35	1.387	.956
Pedestrian crossings are well marked	2.62	2.86	1.270	1.010
26. There are enough pedestrian crossings	2.44	2.72	1.190	.987
Pedestrian signals allow enough time to cross the street	2.71	3.05	1.282	1.012
There are traffic lights on the routes I walk	2.68	2.95	1.280	.996
Cars obeyed traffic rules and posted speed limits	2.91	3.00	1.283	.969
Drivers obey traffic light directives	2.80	3.00	1.306	.919
There are sidewalks in my community	2.33	3.13	1.152	.993
Sidewalks are clearly separated from roads	2.17	2.94	1.052	.993
The sidewalks are wide enough for at least two adults to walk side by side	2.13	3.19	1.038	.932
There are parked vehicles, hawkers and other obstructions, undermining easy and unimpeded use of sidewalks in my community	3.68	3.48	1.309	.983
There are garbage, choked and uncovered smelly gutters in my community walkways	3.41	3.37	1.311	1.084
Walking routes in my community are well-lit at night	2.69	3.00	1.238	1.049
Sense of security				
There are threats of attack from unknown people whilst walking during the day	2.23	3.00	1.292	1.007
There are threats of attack from unknown people whilst walking at night	3.59	3.59	1.313	1.055
There are other commuters on the route I use when walking during the day	3.76	3.51	1.248	.931
There are other commuters on the route I use when walking at night	2.92	3.41	1.100	.877
I can easily be seen by people in their homes or workplaces while walking	3.22	3.41	1.353	.906
Sense of convenience				
The surface of the route I walk is level and flat	2.97	3.05	1.231	1.012
Where I walk has sidewalks and walkways that are present on both sides of the street	2.18	2.93	1.101	1.007
Where I walk has continuous, uninterrupted sidewalks and walkways (don’t suddenly stop)	1.99	2.45	.987	.896
Where I walk has sidewalks and walkways that are	2.2	2.54	1.1	.955

in good condition (no dislodged pavement, weeds etc.)	2		21	
Where I walk has sidewalks and walkways that are clear of bushes, garbage etc.	2.34	2.99	1.141	1.014
The walkways are dusty during the day	2.75	2.70	1.300	.804
There are tall grass and weeds along the route I walk	2.50	2.68	1.192	.931
Where I walk has sidewalks and walkways that are easy to push strollers and wheelchairs	2.10	2.73	1.047	.982
There are places along the route where I can go for shelter (e.g. when it is raining).	2.29	2.81	1.211	1.096
I can see street names and other wayfinding aids when walking	2.82	3.36	1.318	.980
Walkways in my community have facilities (e.g., sidewalks) to support the walking needs of persons with disabilities, elderly people	1.88	2.62	1.072	.931
Sense of attractiveness				
Sewers along walking routes are well covered	2.09	2.52	1.223	.997
There are trees and lawns along the route I use	2.40	2.52	1.209	.956
There are obstructions such as rubbish bins, broken poles, or trees on the routes	2.99	3.23	1.365	1.048
The landscaping is attractive along the route I walk	2.62	2.90	1.244	.967
There are attractive built environment features (e.g., Buildings) along the routes I use	2.75	3.34	1.228	.955
Trees along the route give shade for the sidewalks/ pedestrian walkways	2.52	3.19	1.259	.938
There are benches and other places to rest along the walking route	2.14	2.34	1.121	.942
There are interesting things to look at along the way	2.74	3.35	1.317	.921
Stores and homes along the walking route are generally occupied and well-maintained	2.68	3.25	1.226	.917

13 References

Acheampong, R. A., Lucas, K., Poku-Boansi, M., & Uzondu, C. (2022). Introduction: Transport and Mobility Situations of African Cities. In *Transport and Mobility Futures in Urban Africa* (pp. 1–11). https://doi.org/https://doi.org/10.1007/978-3-031-17327-1

Amoako-Sakyi, R. O. (2017). *School path walkability and pedestrian crashes in the Cape Coast Metropolitan Area* [University of Cape Coast]. https://doi.org/10.1017/CBO9781107415324.004

Baig, H., Abdullah, M., Dias, C., & Basheer, M. A. (2025). Examining access to daily functions through the lens of the 15-minute city concept in a highly populated city. *Geocarto International*, *40*(1), 2473502. https://doi.org/10.1080/10106049.2025.2473502

Flynn, A., Tremblay, P. F., Rehm, J., & Wells, S. (2013). A modified random walk door-to-door recruitment strategy for collecting social and biological data relating to mental health, substance use/addictions and violence problems in a Canadian community. *The International Journal of Alcohol and Drug Research*, *2*(2), 7–16. https://doi.org/10.7895/ijadr.v2i2.143

Forsyth, A. (2015). What is a walkable place? The walkability debate in urban design. *Urban Design International*, *20*(4), 274–292. https://doi.org/10.1057/udi.2015.22

Odame, P. K. (2022). Recounting the Blessings and Curses of Living with a Disability: The Experiences of Persons with Visual and Physical Impairment in Accra. *Global Social Welfare*, *9*(4), 203–210. https://doi.org/10.1007/s40609-022-00244-9

Sam, E. F., Uzondu, C., Odame, P. K., Mogaji, M., Boateng, F. G., & Ikeogu, C. (2024). *Walking as a mode of transport in 'unwalkable' contexts: Cross-city experiences from Ghana and Nigeria*. A study report for Volvo Research and Educational Foundations (VREF).

Uzondu, C., & Etika, A. A. (2022). *The Future of Non-motorised Transport in Urban Africa BT - Transport and Mobility Futures in Urban Africa* (R. A. Acheampong, K. Lucas, M. Poku-Boansi, & C. Uzondu (eds.); pp. 297–312). Springer International Publishing. https://doi.org/10.1007/978-3-031-17327-1_19