

PERSPECTIVE

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Art, science, and life: where arts-based research and social-ecological transformation can meet

Maria Elizabeth Heines^{1*} , Christina Breed², Kristine Engemann³, Linette Knudsen⁴, Lwandiso Colo⁵, Sifiso Ngcobo⁶ and Maya Pasgaard⁷

Maria Elizabeth Heines is the voice of this article (see Author contributions).

*Correspondence:
maria.heines@icloud.com

¹ Faculty of Science, University of Copenhagen, Copenhagen, Denmark

² Department of Architecture, University of Pretoria, City of Tshwane, South Africa

³ Department of Biology, Aarhus University, Aarhus, Denmark

⁴ Faculty of Social Science, University of Copenhagen, Copenhagen, Denmark

⁵ School of Engineering, University of Pretoria, City of Tshwane, South Africa

⁶ Faculty of Health Sciences, University of Pretoria, City of Tshwane, South Africa

⁷ Department of Biology, Aarhus University, Aarhus, Denmark

Abstract

Arts-based research offers an innovative approach to today's social-ecological challenges. Many authors ascertain the transformative power of arts-based research lies in its ability to generate holistic and collaborative encounters which facilitate change. To advance critical discussions around arts-based research, the following article opens up pockets of success as well as the limitations and failures of the My Mabo-pane photovoice project. This project intended to support urban transformation in the City of Tshwane, South Africa, by asking participants to photograph and reflect upon a nearby green space afflicted with various social and environmental challenges. Results suggest alternative ways of knowing, which contribute to transformative learning, can link arts-based research to social-ecological transformation. However, despite this promising pathway, analyses also reveal realizing social-ecological transformation with arts-based research is no walk in the park. Rather problematic assumptions around knowledge and knowledge production, emerging in tensions between art and science, often trump the emancipatory intentions of photovoice. And broader structural challenges, that arts-based research situates itself in and against, pose a strong barrier for social-ecological transformation. In response to these barriers, this article argues for a collaborative arts-based research practice centering community realities on multiple scales via a merging of art, science, and life.

Keywords: Art-based research, Photovoice, Social-ecological transformation, Urban green spaces

Policy and practice recommendations

- Support urban transformation with arts-based research as a holistic approach to repairing human-environment relationships.
- Openly document and reflect upon the tensions that arise between art and science during arts-based research. Such consideration can ensure a more fruitful integration of the two disciplines.



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- During arts-based research, center practical benefits and community feedback in relation to broader material and political challenges to provide for short and long term community needs.

Science highlights

- By accessing alternative ways of knowing and stimulating transformative learning, arts-based research can support urban transformation with new and more nuanced human-environment relationships.
- Arts-based research is not a quick or seamless solution for urban social-ecological challenges. In practice tensions between art and science reduce opportunities for transformation by downplaying alternative ways of knowing and by inhibiting a true co-production of knowledge.
- Material and political factors can strongly hinder transformative outcomes in arts-based research. Recognizing and acting within this entanglement of art, science, and life is an opportunity to redress harmful hindrances.

Introduction

The integration of the arts into scientific research is largely motivated by a desire to harness the transformative power of art (Finley 2008; Leavy 2015; Lineberry and Wiek 2016). A characteristic which especially attracts feminist and decolonial scholars fed up with the incestuous nature of academia—where knowledge is produced by and for academics—and committed to social justice (Hooks 1995; Leavy 2015). For these more critical scholars, arts-based research (ABR) is a practice where knowledge is *co-produced* to challenge the harmful or limiting beliefs underlying unjust realities (Carpenter and Horvath 2022; Crisman 2022).

The early days of ABR consisted of fringe researchers from various disciplines who sought “more holistic insights into human experiences,” which the rational focus of scientific inquiry could not offer (Heinrichs 2018, pg. 134). Over time research developments in psychology and social work have cemented the utility of the arts—whether visual, theatre, dance, music or fictional writing—to stimulate critical thinking and provide new perspectives on research topics. More specifically, this interdisciplinary endeavor makes room to recognize and experience knowledge production in terms of unique physiological, emotional, and mental processes that are not captured in traditional quantitative and qualitative methodologies (Eisner 1991; McNiff 1998; Barone and Eisner 2012; Leavy 2015; Heinrichs 2018).

Recognizing this advantage, Heinrichs (2018) argues for integrating the arts into sustainability research to help understand and transform social-ecological systems for the better. *Transformation* in this context refers to the political, material, social, and cultural shifts required to redress structural environmental injustices (Brand and Wissen 2017; Heinrichs 2018). This call for artistic methodological innovation, as a means for transformation, has been answered by many in the sustainability sciences who integrate art into data collection, analyses, and/or dissemination (Thompson 2012; Heras et al. 2021).

My personal foray into ABR has begun with photovoice—a research method that asks participants to photograph and reflect on their environment and circumstances.

Originally developed by Wang et al. (1997), this method, like other ABR methods, draws upon the principles of participatory action research. An approach which situates participants as collaborators, rather than as research subjects, to co-produce practical knowledge that supports positive individual and community change (Axinte 2022). Drawing inspiration from these participatory principles, photovoice is designed “(1) to enable people to record and reflect their community’s strengths and concerns, (2) to promote critical dialogue and knowledge about important community issues through large and small group discussions of photographs, and (3) to reach policy makers” (Wang et al. 1997, pg. 370). Photography is selected as the means to achieve participatory and social justice goals due to its ability to legitimize participant perspectives, empower participants as experts on their lived experiences, and communicate across wide audiences (Johnston 2016; Derr and Simon 2020; Axinte 2022).

Following this tradition, the My Mabopane photovoice project centered community perspectives on a local urban green space to inform sustainable management practices in the City of Tshwane, South Africa. The study site of Mabopane is a peri-urban black township located on the city’s North West periphery. Mabopane and its majority Tswana-speaking population are a product of comprehensive Apartheid spatial planning policies rolled out in the 1960s (Horn 2021). Wherein racial and ethnic segregation was forcibly enacted for the political, social, and economic dominance of the ruling white minority (Mayne 1999). Despite the 1994 democratic transition, acute social and environmental issues continue to disproportionately burden people of color in South Africa (McDonald 2002). Challenges afflicting the urban green space and surrounding community in Mabopane include crime, unemployment, lack of service delivery, noxious environmental pollution, climate change vulnerability, and biodiversity loss (GRIP 2021; Engemann et al.: Multifunctional and unmanaged: Unexpected synergies between health and biodiversity benefits from urban green spaces in the City of Tshwane, South Africa., unpublished).

Such damaging social-ecological challenges can be situated within wider forces of colonization, rapid urbanization, inequality, and dysfunctional governance regimes that contribute to degraded urban environments in sub-Saharan Africa and the Global South at large (Breed et al. 2023). Transformation in these cases acts as a strategic opportunity to bolster climate mitigation, economic opportunity, social cohesion, individual well-being, and other critical ecosystem services (du Toit 2018; Breed et al. 2023).

While ABR offers an innovative approach to social-ecological challenges found in Mabopane and beyond, the transformative promise can be lacking in practice (Heinrichs 2018; Lineberry and Wiek 2016). Literature reviews on photovoice, in particular, note this increasingly popular method often fails to connect participants to policy-makers, outline social justice intentions, and/or identify positive contributions to the circumstances of participants (Sanon et al. 2014; Derr and Simons 2020). Leading scholars to ask for more honest assessments of photovoice projects that identify challenges and learn from their shortcomings (Derr and Simons 2020; Axinte 2022). Similarly, in the broader context of ABR Butler-Kisber (2010) writes “there needs to be an upfront and continuous questioning of the ‘so what’ or utility of our work. Does our work make a difference, and if so for whom, and how and why?” (pg. 150).

In aims of advancing critical discussions around photovoice and ABR, the following article opens up pockets of success as well as failures of the My Mabopane photovoice project. This transparent analysis begins with the promising pathways found between ABR and social-ecological transformation—which hinge upon alternative ways of knowing and transformative learning processes. Then, tensions arising in practice between art and science reveal greater integration is needed to realize the promise of ABR. Finally, a reckoning with the broader structural challenges ABR situates itself in and against, calls for collaborative efforts that center community realities on multiple scales via a transformative merging of art, science, and life.

Methodology

Photovoice is a participatory research method wherein community members share perspectives and reflections using photography as a visual aid (Kessi et al. 2019). The My Mabopane photovoice project, hereafter referred to as My Mabopane, mobilized this methodology to integrate community members and their perspectives into urban green space management in the City of Tshwane, South Africa. A large heterogeneous urban green space situated in Mabopane, that belongs to the city and is earmarked as an ecological support area, became the site of interest after deliberation between city officials, practitioners, and researchers. The green space is composed of mainly natural but also built infrastructure, and key determining factors during site selection included a lack of previous research in the area, historic marginalization, a need for recreational green space, and protection of the wetland area (GRIP 2021).

My Mabopane was largely carried out by the 'photovoice team' composed of myself, another university master's student, and two local photographers/research assistants. During fieldwork in March and April 2022 the photovoice team sought potential site users as photovoice participants by connecting with a local secondary school and technical college adjacent to the urban green space (Heines 2022; Knudsen 2023). Initial meetings with school administrations were held to present project intentions of using photography to stimulate engagement with the local environment. Received feedback informed the planning and implementation of photovoice activities with 20 secondary school student participants (age 15 to 17) and 14 technical college student participants (age 19 to 30) selected by school administrators.

Photovoice activities began with a workshop, taking place on each school campus, about how lighting, focus, and composition in photography can be used to tell a story. Participants were then asked to analyze photographs from provided magazines and photo books to further develop their visual literacy as a tool for self-expression. Following this workshop, participants were given camera phones to photograph aspects of the green space that they liked and disliked. Using the selected photographs, individual written reflection was guided with questions on what participants saw in their photographs and what this tells about the green space, community, and/or their own lives. Willing participants then presented their photographs and reflections in focus groups of five to seven participants and one photovoice team member. After individual presentations, plenary discussions about the green space were guided by the photovoice team member. To recognize the participants' efforts and further interact with the urban green space, the photovoice team organized an outdoor exhibition attended by participants, school

administrators, and community members. After the completion of these photovoice activities informal follow-up interviews were held with the secondary school administration and one secondary school participant in March 2023. The following article uses field notes from the mentioned My Mabopane activities and focus group transcriptions to investigate the role of ABR in social-ecological transformation.

Pockets of success

After completing My Mabopane, one participant reached out to thank the photovoice team and noted “if it wasn’t for you, we wouldn’t have known the importance of the green space in our community.” This participant perspective positions the photovoice team as responsible for the collective epiphany, but overall emphasis might be better placed on the ability of ABR to stimulate environmental awareness. I suggest this because photovoice activities were designed to evoke personal reflections and group conclusions formed by the participants themselves. As such, knowledge dissemination from researchers to participants was limited to the fundamentals of photography (i.e. lighting, focus, and composition) to provide visual tools for participants to construct meaning with. Within photovoice activities, no actual lecturing took place on sustainability or environmentalism¹. Suggesting this process of making and reflecting upon photographs can produce new understandings of social-ecological systems in individuals and thereby influence public opinion. Arguably, the building blocks for societal change (McAdam et al. 1996; Tarrow 1998; Johnston 2016).

This “ability [of art] to change the world, not by money or force, but by orientation,” motivates many ABR scholars to place faith in the power of art to achieve *transformative learning* outcomes (Lawrence and Cranton 2009; Hannula et al. 2014 pg. X). A term denoting “a kind of deep learning that challenges existing, taken-for-granted assumptions and meanings” (Hoggan et al. 2009, pg. 9). Although this process is widely acknowledged as pivotal to sustainable development, there is debate about how transformative learning occurs (Newton 2009; Harder et al. 2020). ABR offers alternative ways of knowing as a mechanism which primes participants for transformative learning by engaging the mind *and* body (Hoggan et al. 2009; Lawrence and Cranton 2009; Leavy 2015). Alternative ways of knowing at play in My Mabopane included experiential, metaphorical, and emotional processes. Below, these domains of knowledge are unfolded.

Inherent to photography and photovoice is an aspect of experiential knowledge. When making photographs, participants interact with the world, experience emotional and physical responses to their environment, and take note of the ordinary (Gunn 1984; Lawrence 2008). My Mabopane participants experienced the green space, which many had never been to before, by either walking through or along the edge while making photographs of things they liked and disliked. After these photography sessions, focus group discussions touched upon many topics including safety concerns and disinterest which kept participants away from the space, but also nature, beauty, community, climate change, pollution, gardening, activism, and tourism opportunities (Heines 2022;

¹ Here it is important to note our positionality as researchers interested in the urban green space. This position inherently suggests our stake in sustainability and, therefore, created a risk for confirmational and interviewer biases. Wherein participants, consciously or unconsciously, offer perspectives that value the environment to seek approval from the photovoice team.



Fig. 1 Technical college participant photograph 'Sand'

Knudsen 2023). The breadth of these conversations greatly contrasts the dominant rhetoric previously found in semi-structured interviews with other community members; that the green space is dangerous and ought to be avoided (Heines 2022). Participants only mentioned crime when prompted by the question 'why do you never go to the green space?' Suggesting photovoice activities, where crime was not experienced nor captured on camera, supported a more complicated understanding of the green space. Wherein the valid crime concern was not forgotten but, through creative reflection, became one component of a larger picture.

Metaphor making describes the, often unconscious and immediate, associations we make in our brains which create meaning. Lakoff and Johnson (1980) argue metaphors are deeply ingrained in human cognition and determine not only what we say, but what we see, think, and do. During My Mabopane focus groups discussions, multiple students expressed the meaning they assigned to their photographs with metaphors. For example, one participant shared that the color of the sand in her photograph represented her skin color as well as the pride and hardships related to this aspect of her identity (Fig. 1). Another participant saw the flower she photographed as symbolic of the great things her community can achieve when working together (Fig. 2). Working off Lakoff and Johnsons' (1980) assumption on the significance of metaphors, seeing yourself in sand may foster closer connections to one's environment. And understanding a community in terms of a flower may provide the foundations for a community to grow or blossom (Horwitz et al. 2002).



Fig. 2 Secondary school participant photograph 'The beauty of nature'

Entangled within these experiential and metaphorical ways of knowing, were numerous expressed emotions. During photography sessions in the green space, participant eagerness mixed with feelings of nervousness were notable. Additionally, deep emotions of community admiration and an awe of nature were connected to metaphor usage in focus groups discussions. Such emotions are thought to contribute to transformative learning by creating more personal and long-lasting memories (Newton 2009; Breed & Mehrtens 2022). Evidence for the strength of this mechanism reveals itself in a follow-up participant interview. This interview took place one year after My Mabopane concluded, yet the participant held a clear position when reflecting on photovoice activities that it is important to be grateful, love, and “do on to the environment as you wish the environment to do to you.” The logic behind her position appeared both moral (i.e. people ought to be good environmental stewards) and practical (i.e. lack of stewardship impacts people negatively) which speaks to the emotional aspect of art to more fully engage with the human experience (Mälkki and Raami 2022).

These analyses suggest photovoice supports transformative learning by accessing or stimulating experiential, metaphorical, and emotional ways of knowing. Meaning photovoice and other ABR can create meaningful activities engaging minds, bodies, and the environment to form new and more nuanced relationships with urban social-ecological systems.

Limitations and failures

The previous section supports the ability of ABR to holistically engage participants in today's social-ecological challenges. However, differences between My Mabopane secondary school and technical college participants reveal significant limitations and failures wherein transformative learning is neither an inevitable nor simple outcome of ABR.²

Very few technical college participants attended the exhibition of their photographs in the green space and those that did left shortly after receiving participation certificates. In comparison, most secondary school participants attended and continued to enjoy the exhibition after the certificate ceremony by dancing and making more photographs. These recorded behavioral differences suggest technical college participants were reluctant to engage in photovoice activities and, therefore, limited in transformative learning. Many interconnected variables, along both researcher and participant lines, feed into this result by complicating a participants' path to transformative learning (Kilgore and Bloom 2002; Hyland-Russel and Syrnyk 2015). Potential variables responsible for the lack of indicators pointing to transformative learning in technical college participants include age, learning style preferences, capacity and time constraints, course expectations and incentives, and ease of researcher-administration communication. To respond to these limiting structural and socio-cultural variables, an ABR practice aiming to maximize transformative learning ought to devote sufficient time and resources (Boström et al. 2018; Tagg 2018). A recommendation aligning ABR with academic cultural shifts that value quality over quantity (Berg and Seeber 2016).

Upon accepting effective ABR simply takes time and money—how should these resources be used to maximize transformative learning? I would like to attend to the tensions that arise between art and science during ABR.

Photovoice activities depend on the accessible and intuitive nature of photography to increase participant ownership, empowerment, and uncover subtle perspectives (Powers and Freedman 2012; Kessi 2019). However, in My Mabopane, emphasis on the ease of photography also created a paradigm which tended to value photography as a tool to collect data over an art form. This was evident in focus group discussions which began with the 'art'—where participants presented constructed meanings in their photographs—but quickly turned away from artistic aspects as researchers directed the conversation to research interests (i.e. environmental justice, social movements, and sense of place). A disregard for the art of photography continued in analysis stages where researchers understood focus group transcriptions as 'data,' but largely ignored the photographs themselves. These imbalances then exclude the alternative ways of knowing, pivotal to transformative learning, that ABR is valuable for (see section "[Pockets of Success](#)").

Similarly, tensions between art and science in My Mabopane reduced opportunities to dismantle hierarchical researcher-researched relationships (Carpenter and Horvath 2022). Tension was evident when researchers remained unwilling to remove their scientist hat and intervene in focus group discussions—for fear of risking notions of

² The aim of working with two different groups of students was to uncover differences in perspectives on the urban green space based on age. However, observed behavioral differences—which colored all aspects of My Mabopane implementation—became unintended results indicative of complicated real-life contexts that need consideration in ABR.

'neutrality' and 'objectivity'. Not only does this question the salience of ABR to co-produce knowledge³, but this dynamic also risks harmful transformative learning outcomes. For example, in focus groups consensus formed around narratives blaming environmental degradation on the community and misconceptions about local ecology and climate change. Such discussions could have benefited from researcher perspectives on the structural roots of environmental degradation and relevant technical knowledge. The lack of intervention likely harmed both transformative learning in student participants and the photovoice team by failing to open up problematic assumptions on social-ecological relationships and researcher-researched dichotomies.

A more thorough integration of art and science is required to avoid such failures and, instead, realize the beneficial understandings of social-ecological systems that ABR offers. The case of My Mabopane reveals the need for continuous and critical reflections on the hierarchical assumptions shaping knowledge and knowledge production (Dewey 1938; Sara 2011; Roux et al. 2017; Schipper et al. 2019; Buyana et al. 2021). Here Heinrich (2018) provides a helpful reminder "that art has always been able to convey truth(s)" (pg. 134). Recognizing this in practice can mean experimenting with where art meets science in your studies, collaborating with artists throughout all research stages as well as placing equal value on scientific and artistic outputs.

Art, science, and life

Up until now, I have circled around social-ecological transformation by discussing the successes and failures of ABR to incite transformative learning. Although these two processes are connected, beyond shifts in individual and public consciousness, transformation also requires material and political resources (Tarrow 1998). This second component is crucial in photovoice projects as participants are typically marginalized actors in need of outside support to bring about change (Johnston 2016). Emphasis here enables researchers to be promoters of transformation (Fischer et al. 2012; Mertens 2016). And asks; can new social-ecological understandings cultivated in ABR lead to a more sustainable future and how?

It is virtually impossible—especially in the short term—to pin down the impact My Mabopane had or will have on local urban green space management. However, evidence of participant collaboration may help connect the dots between ABR and transformation. The follow-up participant interviewee, specifically, appreciated photography aspects of My Mabopane as it helped her see what other students think, love, and want to change about the green space. This plurality of perspectives was likely facilitated by supportive group dynamics, especially at the secondary school, where students were quick to express agreement, excitement, and interest as fellow classmates presented their photographs. Such group dynamics are important to note because they reveal an opportunity for validation and bonding between participants around the subject of sustainability—and may explain the interviewee's sustained recollection of photovoice activities

³ The true co-production of knowledge is further complicated when acknowledging broader circumstances around My Mabopane. This project fell under a GRIP research collaboration with the City of Tshwane that identified urban green spaces and communities which could particularly benefit from researcher activity. This collaboration supported a co-production of knowledge between institutional actors, but at the community level photovoice activities acted as an outside intervention.

which took place a year prior. All in all suggesting the collaborative reflection process in photovoice and other ABR can help inspire, maintain, and build networks of people committed and connected to their community and environment (Horwitz et al. 2002; Breed et al. 2015; Crissman 2022).⁴

However, such empowerment does not necessarily contribute to transformative change, especially in the case of My Mabopane, as activities remain steeped in practical and ethical dilemmas. Critical perspectives on photovoice assert that many projects fail to interact with external factors, such as material and political inequalities, limiting the reach of participant voices. This risks unfairly prompting participants to envision change without providing access to the resources and networks required to materialize new social-ecological understandings in the real-world (Johnston 2016; Sanon et al. 2014; Derr and Simon 2020). Similarly, My Mabopane failed to capture the momentum of participants who voiced a desire to see and enact change in their lived environment. Rather participant photographs became disposable snapshots after research activities were complete, and any stirred up political motivations face a similar risk.

Despite intentions to connect participants and their perspectives to policymakers, ultimately, no significant policymaker engagement was achieved during My Mabopane. This was largely due to the prioritization, given limited time and resources, of photovoice activities with community members over policymakers. To overcome this either-or quality afflicting many photovoice projects, Tanjasiri et al. (2011) advocate for robust planning incorporating policymakers from the outset. Make no mistake, this is certainly a crucial aspect required to realign photovoice activities to the emancipatory intentions of Wang and Burris (1997). There is no substitute for intentional transdisciplinary collaboration when seeking social-ecological transformation (Balint et al 2011; Perz 2019). However, separation between community members, researchers, and policymakers within wider research activities suggests deep divisions which cannot be wholly mended by planning ahead (Angelstam 2017; Perz 2019). A dynamic set of factors contributes to these divisions in the City of Tshwane including; competing incentives, lack of resources, already stretched capacities, distrust between actors, and socio-spatial inequalities rooted in colonial and Apartheid legacies as well as maintained by current regimes (Breed et al. 2023).

This unwieldy reality, where actors operate in different contexts and norms, requires significant attention in transdisciplinary research (Perz 2019). In ABR, the practice must go beyond integrating art and science, two disciplines critiqued for their out-of-touch character, to effectively capture various realities at play in a way which supports social-ecological transformation (Filipovic 2005; Castree 2015). In essence, I am calling for (and pursuing) a merging of art, science, and life that challenges the limiting boundaries between these categories (Gieryn 1983; Buyana et al. 2021). What excites me about this quest is that it asks me, as a person, as an artist, and as a researcher, to align my work with my life. *How else would I learn, understand, and contribute to the world but by living in it?*

⁴ Despite this opportunity, collaboration and perspective sharing was limited between participants and the photovoice team (see section "Limitations and Failures"). To help resolve this, one could experiment with asking researchers to also make photographs and participate in focus groups in a manner more similar to participants.

For inspiration on ABR practice rooted in reality; there are numerous socially engaged artists—like Theaster Gates, Mel Chin, and Gilles Clément—with a knack for bringing together and reconfiguring material, economic, institutional, and cultural realities across the globe (McGraw 2012; Gandy 2013; Lineberry and Wiek 2016). In Mabopane, opportunities for a similar ‘synthesis’ are found in participant, administrator, and community feedback. Reported benefits of My Mabopane included having an afterschool activity which sheltered students from crime, expanding the social network of students by connecting them to young professionals, and providing technical photography skills. While the main critique was that superficially short photovoice activities limited skill learning and, therefore, potential economic and creative benefits for participants.

Responding to, centering, and expanding upon practical points, such as the ones above, ought to crucially inform any ABR practice committed to social-ecological transformation. Here day-to-day wins, sought by communities, researchers, and artists collectively, can be embedded within the process of wider, much needed structural change. Creating an exchange between personal and political realities that can respond to short and long term community needs. Not only an opportune stepping stone, ABR—with the risk of being overly sentimental—may also provide the *will* for social-ecological transformation. Collaboration in My Mabopane, although flawed, made room for the human moments—of uncertainty, trust and commitment—making our efforts meaningful.

Abbreviations

ABR Arts-based research
GRIP Integrative Green Infrastructure Planning

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Authors’ contributions

Maria Heines, Linette Knudsen, and Maya Pasgaard conceptualized the study. Maria Heines has written all drafts and acts as the voice of this article to reflect that the article is derived from her perspective and personal learning experience. Christina Breed, Kristine Engemann, and Maya Pasgaard commented and provided edits on all drafts of the manuscript, contributed to concept development, framing and content. The photovoice team, consisting of Maria Heines, Linette Knudsen, Lwandiso Colo, and Sifiso Ngcobo, performed material preparation and data collection during the My Mabopane photovoice project. Linette Knudsen commented on later drafts of this manuscript. All authors read and approved the final manuscript.

Authors’ information

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Availability of data and materials

The data will not be shared due to considerations of privacy of participants.

Declarations

Ethics approval and consent to participate

GRIP research activities were granted permission by the City of Tshwane, South Africa. All My Mabopane photovoice project participants gave informed written consent to participate and contribute to published research outputs. Informed written consent for participants under the age of 18 was obtained with parent/guardian consent forms.

Competing interests

The authors have no relevant financial or non-financial interests to disclose.

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