RESEARCH ARTICLE

Fostering the transformative potential of participatory photography: Insights from water and sanitation assessments

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Abstract

Transformative research and evaluation both aim to foster social change as part of the inquiry process, often leveraging participatory and tactile methods with an advocacy objective. One such approach is participatory photography which engages marginalized individuals in image creation and includes activities such as photovoice and photo-elicitation. This article considers opportunities to strengthen the transformative potential of participatory photography activities within the water, sanitation, and hygiene (WASH) sector. The research comprised two components: 1) a systematic literature review of participatory photography activities in the WASH sector (n = 32) and 2) an empirical case of a photovoice evaluation of a staff-focused gender mainstreaming intervention in Cambodia (n = 20), including a structured survey, structured observations of the evaluation process, and three participatory reflection workshops with program leadership. Drawing on the two components, we reflect on the extent to which photography-based approaches in the WASH-sector have been transformative. Our findings indicate that transformative potential can arise from participatory photography's process and outcomes. The research identified opportunities for the WASH-sector to strengthen participatory photography by 1) purposefully recruiting participants, 2) creating engaging orientation opportunities, 3) supporting participants in ethical image creation, 4) facilitating image interpretation, and 5) progressing photo-stories into advocacy. The study also considers how participatory photography can address gender inequalities inherent in photography, hence seeking gender-transformation. While these insights were derived for participatory photography activities in the WASH sector, the findings and implications have relevance in other sectors that seek to investigate complex change and foster transformations.

Introduction

Participatory approaches to visual storytelling, and in particular those using photography, emerged in the late 1950s within interpretative anthropology [1]. Through the digitization of photography these approaches have become more accessible for researchers and participants

alike [2]. Participatory photography engages marginalized groups to document the needs of communities and leverage images as powerful tools for change [3]. This use of photography incorporates aspects of participatory action research and collaborative interpretation in alignment with feminist and social justice values [3]. Engagement of marginalized voices in participatory processes can also lead to what is known as transformative polyvocality—*"the power of many voices to shift and sustain narrative"* [4]. With participatory photography, images become not only the means by which to identify inequalities but also the means through which to address them.

The emancipatory ideals found within participatory photography overlap and align with transformative research and evaluation [5, 6]. Transformative approaches aim to foster change both '*through*' and '*from*' assessments. Transformation which arises '*through*' implies the ways in which research and evaluation processes can foster empowerment and agency for participants. Transformation which arises '*from*' identifies the ways in which results of research and evaluation activities can lead to advocacy reducing inequalities.

Transformative change outcomes also align with the objectives of the international development community, inspired by the Sustainable Development Goals (SDGs). In particular, SDGs 5 and 10 –gender equality and reduced inequalities, require non-traditional approaches to investigate, describe and transform exclusionary practices [7]. This is also true in the water, sanitation, and hygiene (WASH) sector spurred on by SDG 6 –clean water and sanitation. The WASH sector's historical reliance on technical solutions has only intensified the social dynamics which perpetuate inequalities [8]. Women, girls, and other vulnerable groups are often disproportionately burdened by ineffective WASH systems [8]. By adopting the WASH-sector as a research setting, we aim to investigate the extent to which photography-based methods can support social change.

This research builds and expands on empirical evaluations within the health sector conducted in high-income countries on the potential of participatory photography, and in particular photovoice, towards empowerment and social justice [9–13]. However, our research is situated in the realm of WASH and draws from a Cambodian empirical case, exploring the transformative potential of participatory photography as a research and evaluation method in international development.

In this article, we focus on the WASH-sector's use of photography-based research and evaluation methods to foster photography's transformative potential. We begin by synthesizing key concepts in photography-based approaches and their alignment with transformative research and evaluation. We then introduce the approach taken in the research, comprising a systematic literature review and an evaluation from Cambodia. Drawing on the literature survey and empirical case, we reflect on the extent to which photography-based approaches in the WASH-sector have been transformative. We present findings from the research with reference to the five stages of participatory photography, with implications relevant for the international development and social change movements more broadly. Lastly, the research considers the extent to which participatory photography activities have gender-transformative potential.

Photography in research and evaluation

Approaches to photographic storytelling within research include varying degrees of three aspects: *documentation*, *elicitation*, and *participation*. Documentary approaches primarily illustrate ethnographic findings and appear alongside narrative insights. For example, photographs have been used in WASH to illustrate gendered differences in access to water [14, 15]. Harper comments that such images *"do not really develop the analytic insights of the authors; rather they appear as visual redundancies to the written text."* [1 p37]. Elicitation approaches,

also known as responsive photography, have been used in surveys and interviews to as 'ice-breakers' to foster an environment for conversation and to spark reflections [1, 16]. These photographs are often created by an unnamed third party. In the WASH-sector, photo-elicitation has been used in through interviews on critical influences on sanitation development [17] and pictorial surveys to explore perceptions on water quality or supply [18, 19]. Lastly, participatory approaches involve the active engagement of respondents in the generation of images [2]. Examples include sociological studies exploring needs and barriers [20], as well as participatory monitoring schemes often focused on water quality [21].

Participatory photography approaches

Participatory photography activities in which the participants are the photographers vary in aspects of image *creation*, *interpretation*, and *utilization*. Adapting Lapenta, we identify three approaches to engaging with participants in the production of images: documentary, reflexive, and collective (photovoice) forms of participatory photography [2]. Where participatory documentation focuses its engagement of participants on image creation, reflexive photography focuses on interpretation, and photovoice on image utilization [2].

First, participatory documentation, often described as community-based monitoring, is the process in which respondents collect and share images with researchers to evaluate change in tangible phenomena easily identified in photographs. Participants are not involved in the analysis or interpretation of images. Examples in the WASH sector include water quality assessed through color [21] or changes in water supply infrastructure [22].

Second, concentrating on less tangible phenomena, such as social dynamics, reflexive photography, also known as 'autodriven photo elicitation' [2], engages participants to interpret their own created photographs, often within one-on-one interviews [22]. The approach is reflexive in that the participant generates meaning from the process of creating an image and discussing the produced image [2].

Third, as the most collaborative and collective approach, photovoice—initially entitled 'photo novella' [3]—is situated within participatory action research and is explicit about the use of images for advocacy [3, 23]. Participants create images individually and then collaboratively interpret them, leading to an advocacy strategy [3].

It is important to note that these three approaches are not distinct, and many studies engage a blend to fulfill relevant objectives and manage research constraints. This blending has led to a wide range of applications labeled photovoice, even though many are less concerned about image utilization for advocacy [20, 24]. For this reason, we use the language 'participatory photography activity' throughout this article to reflect the breadth of ways in which participatory photography can be used in monitoring, assessment, research, and evaluation.

Stages of a participatory photography activity

Despite their differences, participatory photography activities can be simplified into an iterative five-stage process alongside transformative potential (**Fig 1**). This framing draws on Wang's initial nine aspects [23], which we clustered into five stages for simplicity and to reflect the breadth of participatory approaches beyond photovoice. Firstly, participants are recruited and oriented on the use of a camera and the photography prompt. Next, participants create photographs over a few hours, several weeks, or in multiple stages. Photographs are then interpreted often through titles and captions–the generation of photo-stories. Interpretation can be conducted through a survey, one-on-one interview, or collaborative group process. Often sessions transcripts are used as additional qualitative data. Lastly, photo-stories are used in advocacy and sensemaking.
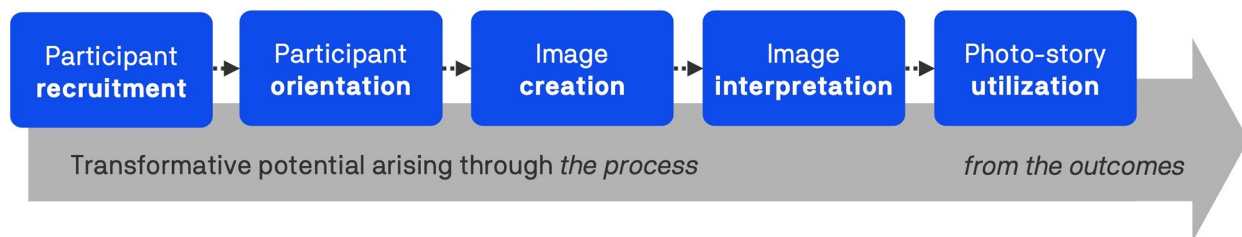
Fig 1. Five states of a participatory photography activity and related transformative potential (adapted from [23]).

The transformative potential of research and evaluation

Emerging parallel to participatory photography approaches, the transformative paradigm emphasizes advocacy, participation, and social justice [5]. The transformative approach contends that *"research and evaluation can and should play an explicit role in identifying and alleviating discrimination and marginalization"* [25]. International development has long contended with increasing meaningful participant engagement of within research and evaluation. Accordingly, **Table 1** describes a spectrum of participation from functional to self-mobilizing. Self-mobilizing participation is the ultimate objective; however, the transformative approach is often more feasible for activities embedded within programs. Transformative research approaches aim to rebalance the power dynamics inherent in the research process–placing more power in the hands of participants. "*It is about radically rethinking who initiates and undertakes the process, and who learns or benefits from the findings*" [26].

For activities adopting a transformative view of participation, positive social change is fostered both '*through'* and '*from'* the process of inquiry. Studies are framed by their transformative potential. The word 'potential' indicates that research cannot fully understand individual or systemic transformation within but must rely on indicators of change. Such indicators measure the bridge between practical and strategic aims. This bridge is described as transformative potential in the language of pioneering feminist development scholars [29–31].

Methods

Ethics statement

Ethical clearance for the research was obtained through the University of Technology Sydney's Human Research Ethics Committee (UTS HREC ETH19-4343). Cambodian ethical approval was not required. Written clearance was obtained from the Country Director of iDE Cambodia. Photovoice participants provided written consent twice: first to participate in the process and again when sharing their photo-stories. Verbal informed consent was collected from all individuals depicted in photographs and written consent was collected when possible. Consent for depicted individuals focused on the use of images for the midline evaluation and not academic publication. As such the images included in this paper do not depict individuals.

Table 1. A spectrum of engagement in participatory research and evaluation approaches (adapted from [27, 28]).

Functional	Instrumental	Consultative	Transformative	Self-Mobilizing
Participants are objects	**Participants are instruments**	**Participants are actors**	**Participants are agents**	**Participants are owners**
Include participants to secure compliance, lend legitimacy, and extract information	Leverage participants to increase the efficiency of the evaluation	Engage participants as representatives and increase the sustainability and accuracy of findings	Engage participants with the goal of empowerment and change	Support participants in their leadership and direction of the evaluation

Dual component approach

The research presented in this article considers two investigations of participatory photography activities in the WASH sector (**Fig 2**). The two components were conducted separately but analyzed together to interrogate opportunities for furthering the transformative potential of participatory photography.

The analysis was inspired by the lead author's reflections on the empirical case study in Cambodia leading to a series of collaborator discussions and re-engagement with the breadth of published literature from the WASH sector. Validity was achieved by adhering to a triad of techniques within the transformative paradigm: researcher reflexivity, collaboration, and peer-debriefing [32].
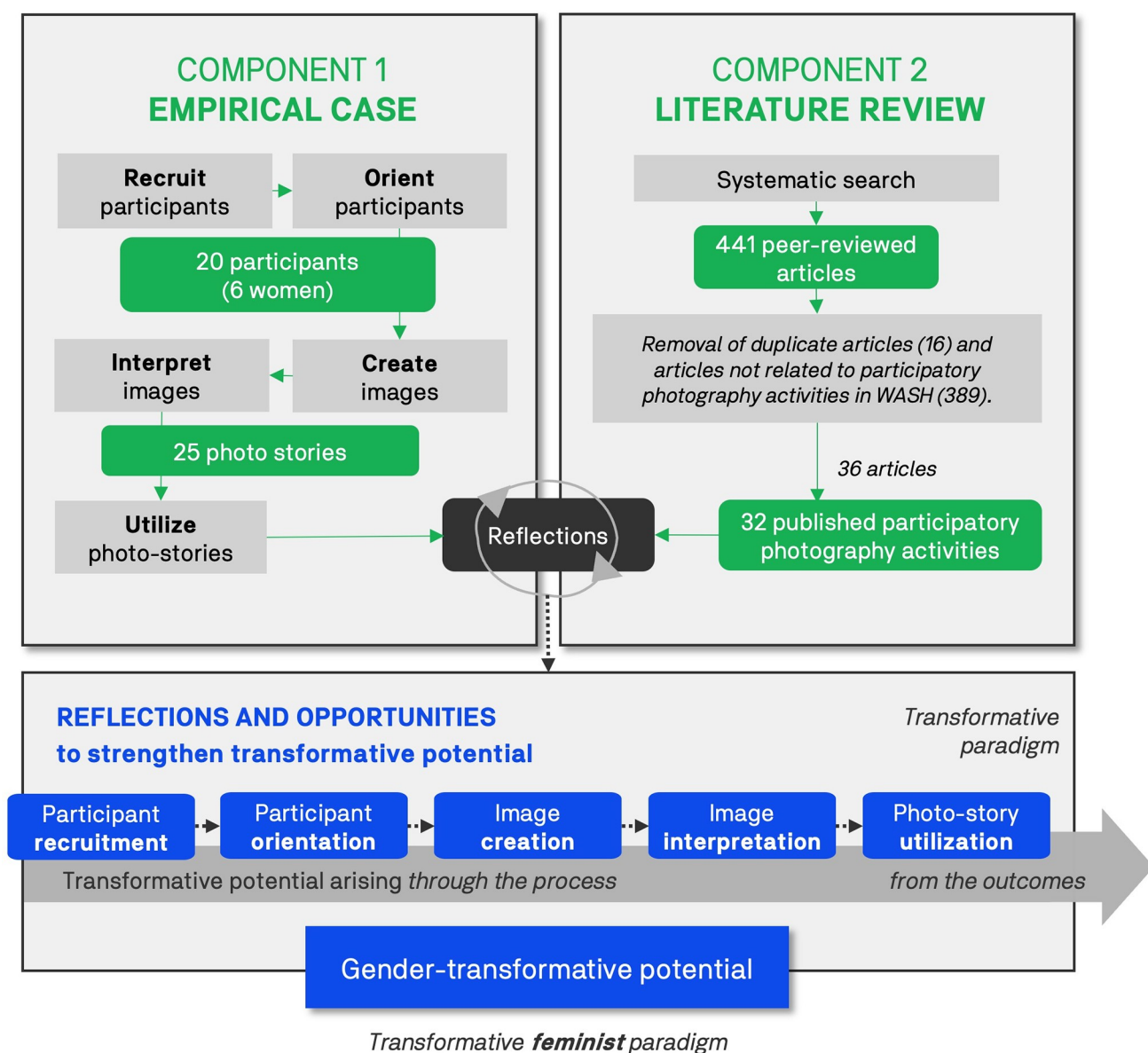
Fig 2. Dual-components of this research: A systematic literature review and an empirical photovoice activity in Cambodia.

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Component 1: A photovoice activity with staff members of a market-based sanitation program in Cambodia

The empirical case was conducted as part of a midline evaluation of gender mainstreaming within a market-based sanitation program (SMSU3). The collaborative action research was conducted with researchers from Institute for Sustainable Futures at the University of Technology Sydney and iDE Cambodia and funded by the Australian Government's Water for Women Fund.

Photovoice [23] was selected in consultation with program leaders who expressed a desire to strengthen staff capacity in smartphone photography. The photovoice activity was conducted during the COVID-19 pandemic, reducing opportunities for face-to-face research. Hence, participants interpreted their own photographs through the submission of an online form.

The photovoice activity was conducted in October 2020. An invitation including overview of the research and ethical procedures, was sent out to all Phnom Pehn based WASH staff on a first response basis. Twenty staff with basic English and access to a smartphone were recruited. Cambodia has some of the highest mobile phone access and 3G coverage rates in the world, with more phone subscriptions than people [33]. Additionally, 48% of mobile phones in Cambodia are smartphones [30], highlighting the ubiquitous nature of mobile phone use in Cambodia. A three-hour online orientation included an introduction to photovoice, ethical considerations (including obtaining informed consent from photograph subjects), and smartphone photography skills. The prompt focused on evaluating the gender-mainstreaming component of the program for staff, change agents, and beneficiaries *"how have women and men experienced SMSU3 [the name of the program] differently?".* Staff participants, then created photographs as they went about their daily work over a period of three weeks. Photographs could focus on personal experiences or observed experiences of beneficiaries. Next, participants were invited to submit up to three photo-stories. The *Qualtrics*-based submission form included sociodemographic questions about the photographer, ethical considerations, five open-ended questions, six closed questions following the VOICE framework [34], and reflections on the photographer's experience of the photovoice activity.

Drawing on captions, titles, and responses to the multiple-choice questions, the lead researcher then coded and clustered images in *Airtable*. Content analysis was completed in three rounds: 1) content–what the image is portraying (themes and activities); 2) context– where the image is situated; and 3) form–visual techniques including color and layout [35, 36]. The code book was discussed and refined in weekly conversations with the authors during the analysis process. Photo-stories were then curated into an electronic booklet with three context-specific chapters.

Three workshops were then conducted to support the research: one sensemaking and two reflection workshops. Details are included in S1 Data. The sensemaking workshop (n = 15) included available photographers and the iDE staff leading the SMSU3 project. The workshop interpreted the photo-stories generating recommendations to strengthen future gender mainstreaming. After one year two online reflection workshops were conducted with the SMSU3 leadership team (n = 5) and the lead author. These workshops interrogated the transformative potential of photovoice as a methodology through reflection, collaboration, and debriefing [32]. Workshop participants were invited to compile insights about the content, context, and modality of the photovoice activity in Cambodia. The lead author then classified insights with relevance to each of the five stages of a participatory photography activity (**Fig 1**). This process led to the emergence of a sixth theme that considered gendered insights from the research, which is situated in a feminist lens of the transformative paradigm.

Component 2: A systematic literature review of participatory photography in the WASH-sector

To investigate the WASH-sector's use of participatory photography activities, a 'systematic search and review' was conducted of peer-reviewed studies [37]. This type of review includes a systematic literature search but does not include a process of quality appraisal [37]. Potential studies in English were identified in October 2021 through the *Scopus* database. *Scopus* was selected due to its connection to less traditional forms of scientific research. Two searches were conducted to ensure a wide breadth of potential articles. One focused more on visual storytelling, the other on photo-elicitation. Search terms included words related to participatory photography, visual storytelling, and the WASH sector. Details on the search strategy and the final selected articles are included in S2 Data. A combined total of 441 potential studies were inspected for duplicates (16) and then screened for relevance to identify 36 relevant articles describing 32 participatory photography activities. As the search found a limited number of studies, quality criteria were not used to exclude any of the literature. The final 36 studies were coded and annotated within *Airtable* with regards to the activity's objective, context, methodological approaches, the five stages of a participatory photography activity (**Fig 1**), and any reported reflections on the activity. This coding and annotation process led to a set of insights which were then mapped against the five-stage of a participatory photography activity (**Fig 1**: recruitment, orientation, photographing, interpreting, and advocacy).

Synthesizing components: Meta reflections of the transformative potential of participatory photography activities in WASH

After the completion of the photovoice activity in Cambodia and the systematic literature review, insights were drawn out focusing on the extent to which the activities exhibited transformative potential. This analysis was conducted through researcher reflexivity and peer-debriefing with reference to the five stages of a participatory photography activity and potential gender-transformative considerations (bottom section of **Fig 2**).

Results and discussion

We now present and discuss the findings of both components of this research in three parts. First, we present an overview of the results of each component. Next, we discuss the transformative potential of participatory photography in the WASH sector with reference to each of the five stages of a participatory photography activity. Lastly, we consider opportunities for participatory photography activities to foster gender-transformations.

Overview of findings from the two components

Component 1: A photovoice activity with staff members of a market-based sanitation program in Cambodia. The photovoice activity generated a curated set of 25 gender-related photo-stories, which overall highlighted the positive interactions amongst and between staff, local business owners, and beneficiaries. Participants included six women and 14 men, broadly representing the gender balance of staff within the office. A total of 32 images were submitted and of these 25 included a response to the question *"why do you think this photo is important to gender equality?"* Sample photo-stories (edited lightly for clarity) are included in **Figs 3 and 4**. Permission was obtained to include these photo-stories; however author names are withheld for privacy.

Drawing on these 25 photo-stories, content analysis identified a range of gendered aspects, contexts, and activities (**Fig 5**). Aspects of participation, decision-making, and changing

A toilet under the rain

Last October I travelled to Oddar Meanchey Province with the project administration manager for the quality control of Easy Latrine for business owners there. I was really surprised to see a toilet with multi-colored zinc walls that had just been built. I interviewed the owner of the toilet and they replied that they used the materials they already had, such as plywood left over from the house construction and old zinc for the building of the toilet.

They like the toilet very much, especially when it is raining, because they do not have to walk through the rain to the bush behind their house as usual anymore, and they no longer worry about their daughters and young kids. Now they feel warm and safe every time.

I shared this photo because I want to show that toilets are important for men and women and children. We do not need to build expensive toilets, we can use the materials that we already have to build the toilet shelter, so it reduces the costs. Toilets help keep families healthy, hygienic, and safe. They ensure privacy and promote gender equality.

Fig 3. Photo-story submission: A toilet under the rain.

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gender roles were common themes within the photo-stories. The context of the photo-stories was balanced between the workplace, the community, and local businesses. The project interventions represented within the photo-stories were wide-ranging, but almost all highlighted the interactions of people with different roles and responsibilities.

This analysis was only possible when exploring the full photo-story and not just the image or associated narrative. When explored together, the titles, captions, and images helped to create a fuller picture of the depicted experiences. For example, an image of a latrine in the rain (**Fig 3**) was elaborated in the first-person narrative caption to explore elements of safety for women and girls in using and accessing latrines, expanding the team's conceptualization of safety beyond violence and animals. The image illustrated the story within the rural, wet environment and provided a visual context through which to understand the significance of the change. Overall, participant's reflections highlighted the value of interacting with people in different environments to stimulate new insights.

Component 2: WASH-related literature review findings on participatory photography activities. The systematic search and review identified 32 participatory photography activities, of which 26 self-described as photovoice. The remaining six were described as modified

The interlocking brick

This photo represents one type of interlocking brick called "the standard interlocking brick." It was taken at a latrine business owner's manufacturing place in Prey Veng Province, Cambodia. Currently, this interlocking brick has prompted a huge increase in profitability and effectiveness for latrine businesses. This should increase their business sustainability. The bricks mean that building latrine shelters or even house walls is speedier and requires less-skilled workers as the blocks are assembled dry and stacked on one another.

In terms of manufacturing, these bricks require less-skilled workers and take less energy, which means both men and women can easily do this work.

Fig 4. Photo-story submission: The interlocking brick.

https://doi.org/10.1371/journal.pwat.0000036.g004

photovoice, participatory photography, and photo-elicitation. A visualization of the sectoral focus, country focus, and photographers from these 32 activities is included in **Fig 6**.

Out of the 32 activities, 13 recruited participants in higher-income countries such as Australia, the United States, and Canada, with fewer barriers to camera access and use. As visualized in **Fig 6**, the activities spanned 17 countries, with large clusters in Australia, the United States, and Kenya. One activity took place in both Côte d'Ivoire and Mauritania; the others were single-country activities. Within Canada, Australia, and the United States, activities were often based in First Nation or Indigenous communities. Regarding sectoral focus, one third were focused on sanitation. Notably, studies within lower- and middle-income countries were
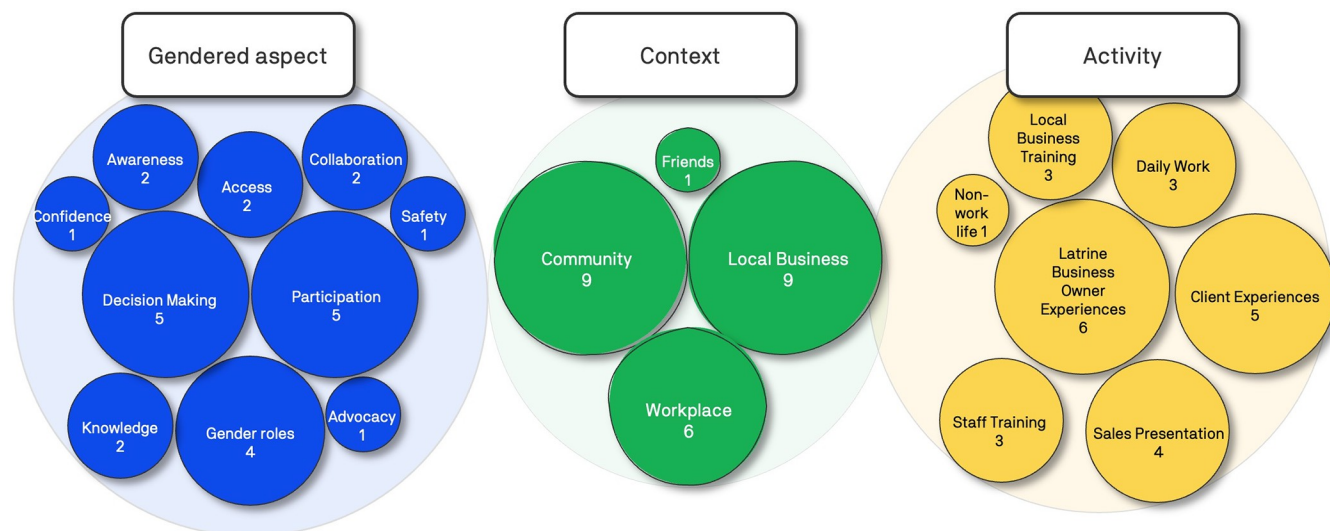
Fig 5. Gender aspects, contexts, and activities from the photovoice activity (25 submitted photo-stories relevant to gender equality). The size of each circle represents the frequency of the theme within the sample. Each column represents a different layer of analysis and includes all 25 photographs.

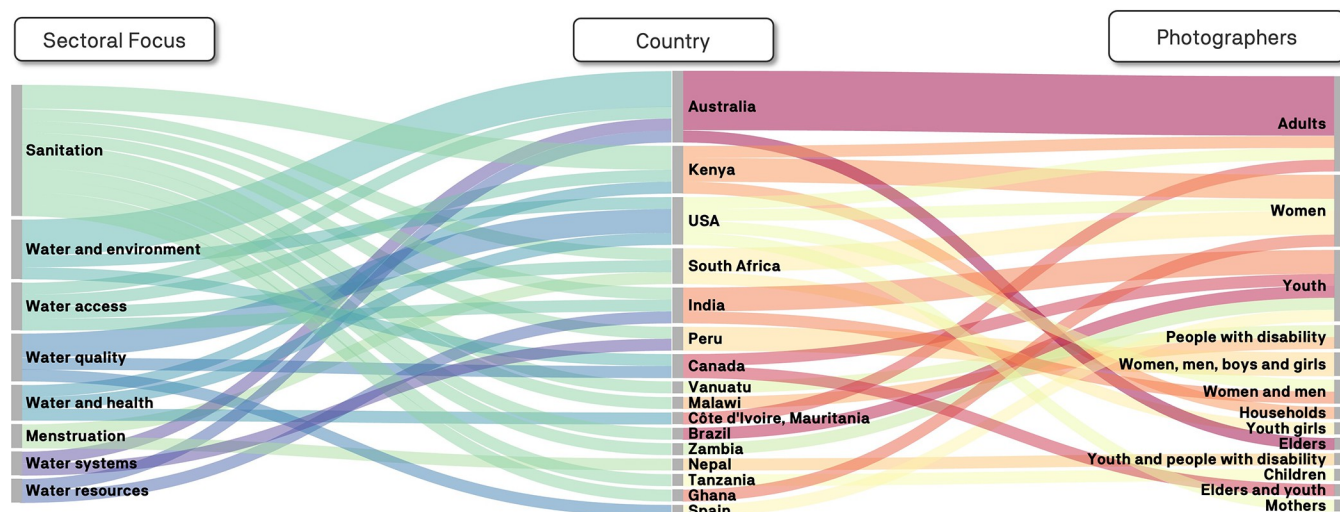https://doi.org/10.1371/journal.pwat.0000036.g005

Fig 6. An alluvial diagram of the sectoral focus, locations, and photographers in the 32 identified participatory photography activities from published literature focused on WASH.

more focused on sanitation, while studies in higher-income countries were more focused on water. Eleven activities explicitly engaged women (one with mothers), and 14 engaged youth and children. One Canada-based activity partnered elders with youth for collaborative image production [38].

Overall, the activities lacked detail on orientation processes, and the majority did not actively seek to orient photographers. Eleven of the activities did not include a description of the orientation training provided to participants. The 21 described orientations included topics such as ethics (in 10 activities), basic instructions on the use of the camera (in 10 activities), basic photography skills (in seven activities), and securing permission from human subjects (in five activities). Two examples, one from the United States and one from Australia, included more advanced photography training.

The 32 activities primarily relied on the use of digital and disposable cameras for image creation, and the activities were often conducted in parallel with further assessment methods such as interviews, workshops, and other participatory activities. The photographing period described in the activities ranged from two hours to six months. Eleven of the activities utilized participatory photography activities alongside other methods including: a quantitative survey (4 activities), focus group discussions (4 activities), interviews (4), questionnaires (3), observation (3), transect walks (2), and participatory mapping (2). The process of participatory photography was described in less detail in the instances where photography was one of a collection of methods. As seen in **Fig 7**, six activities used a mixture of both provided and personal cameras beyond the more common digital and disposable cameras. Only four activities leveraged smartphones within the contexts of Kenya, Canada, and the United States (as indicated in both the mixture and smartphone categories). Disposable cameras were used as late as 2020, despite identified challenges in the development of photography film [39].

Within the 32 activities, interpretation of the photographs was primarily conducted in a participatory manner using interviews and workshop discussions, as depicted in **Fig 7**. Three of the activities did not engage participants in the interpretation of the photographs, and two multi-method activities did not describe analysis procedures. Seven of the activities reported using the SHOWed technique to support photograph interpretation [23]. Fifteen of the
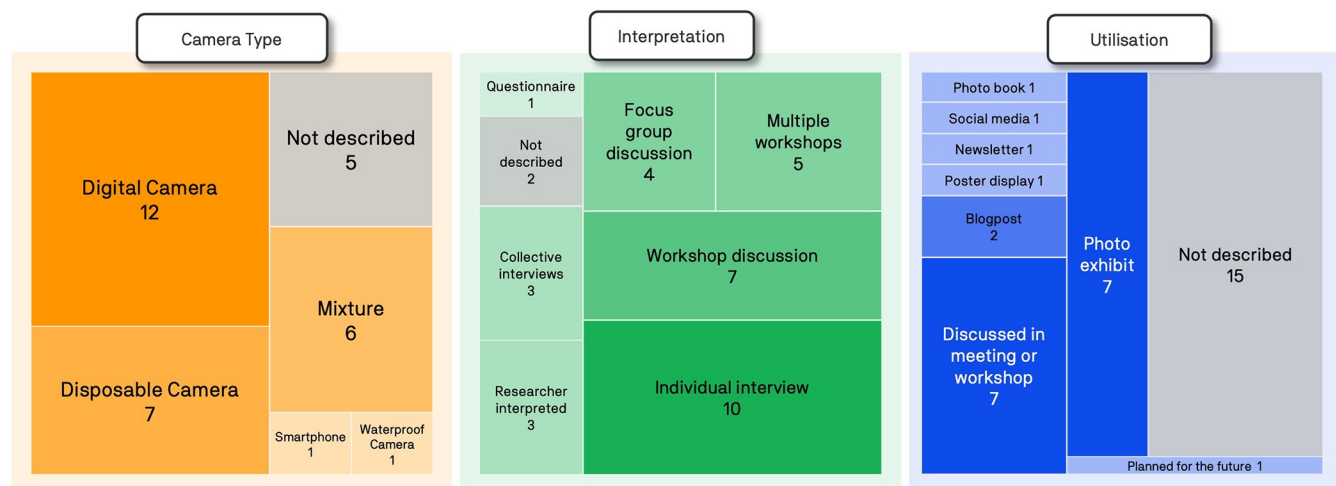
Fig 7. Landscape maps of the camera type, photograph interpretation process, and utilization technique in the 32 WASH examples of participatory photography activities from published literature.

activities described additional analysis undertaken by the researchers. Several of the activities identified challenges in ensuring that photographs aligned with the topic of the research [40, 41].

Approaches to photo-story utilization for advocacy were often unreported and primarily appeared in applications where photovoice was the sole method. As seen in **Fig 7**, 15 activities did not report any form of advocacy or utilization of results. Common approaches to advocacy included photo exhibits and collaborative workshops with relevant stakeholders. However, several recent activities described using blogs and social media to influence future policy and program design. None of the activities discussed advocacy outcomes.

In both higher and lower-income contexts, the WASH-sector has adopted the use of participatory photography activities in a breadth of creative ways, often focused on identifying challenges and bringing under-represented voices to the table. Nonetheless, as will be discussed in the following section in conjunction with our empirical component, there is an opportunity to strengthen transformative potential across all stages of implementation.

Strengthening the transformative potential of participatory photography

We now interrogate the extent to which WASH-related examples and our empirical case reflected transformative potential across the five stages of a participatory photography activity. Implications for researchers seeking to strengthen the transformative potential of future activities are also introduced with each stage. As articulated by theorists in feminist development, we specifically use the phrase '*transformative potential*' to highlight that transformation cannot be guaranteed but that steps can be taken to foster transformations [30].

Stage 1: Fostering agency through purposeful recruitment. Participatory photography activities hold opportunities to reverse the power dynamics inherent in research. However, our analysis suggests that the camera can be either a barrier or enabler of transformation and that thoughtful recruitment can reduce potential participant distress. Foundational literature on photovoice describes the value of *"entrust[ing] cameras to the hands of people to enable them to act as recorders, and potential catalysts for change"* [3 p369]. In other terms, the process can create space for participants to *"take control"* [10] of the research process reversing power dynamics.

Within our empirical case, insights from the reflection workshop indicated that the photo-voice activity provided an opportunity to strengthen the agency of participants to "*facilitate*" the direction of the activity: *"they [respondents] had the liberty and agency to be decision makers and choose their story and what they really wanted to highlight,"* that participants "*expressed their opinions without bias or outside input impacting the responses,"* and that participants were *"more engaged through [the] activities."* Additionally, the reflection process from our empirical case noted that a new group of participants were engaged in the evaluation process and broadened the types of outcomes that were identified.

Within the broader literature on participatory photography in the WASH-sector, researchers within indigenous communities describe the value of the approach as a *"means for participants to direct the research process"* [42]. However, WASH-literature activities that recruited women from marginalized communities identified a range of challenges and potential distress related to women's historically limited agency. For example, some marginalized women out-sourced the activity to male relatives. Another study described the complications of training women to use the camera [40]. Others described women staying together during the photography activities where men wandered about individually [43]. However, in other circumstances, and in particular with men and children, the approaches were noted to be fun and enjoyable [41, 42, 44]. Others identified the sense of pride and satisfaction exhibited by participants [45]. These differences can be traced back to the gender digital divide [46] and further solidify the gender and social dynamics of personal agency attached to photography and documenting one's personal experiences.

Several examples emerged from the literature to counter these challenges. One activity recruited marginalized women who already had program-based experience with smartphones for the identification of water security risks [47]. Similarly, in our empirical case, participants already used smartphones in their day-to-day lives. Another activity engaged children in creating photographs and then involved their mothers in interpretation [41]. Familiarity with the camera (smartphone) technology led to more positive outcomes and mitigated potential distress or harm.

Ultimately within short-term photography activities—given that fostering agency is a long-term process—recruiting participants already familiar with smartphones can reduce potential harm and leverage the camera as an enabler of change. For example, activities may choose to work with program staff rather than marginalized community members without camera experience. Staff-led photography activities can still focus on beneficiary experiences in the prompt, as in our empirical case. Longer-term photography activities create space to better support marginalized community members and are best embedded as an intervention activity. In cases where long-term direct engagement is not feasible with marginalized participants, other methods such as oral histories and transect walks may offer opportunities for polyvocality without causing potential distress or harm.

Stage 2: Strengthening photography skills through meaningful orientations. Our empirical example identified the benefits of strengthening photography skills within the orientation sessions. Within foundational literature on participatory photography, Wang's guidance identified that "*facilitators may wish to minimize technical advice during the initial workshop to avoid inhibiting people's creativity*" [3].

For our activity in Cambodia, including skill-building within the orientation session was in response to a request from the program leadership team and aimed to redress the extractive nature of many data collection processes. Our participant reflections included learnings around the use of cameras, writing captions, photography ethics, lighting, and creating a safer photography environment. One respondent noted a reframing of the notion that only an expensive camera could create good photographs. "*[I learned that]. . .my smartphone is capable*

of taking nice photos". Another participant noted that the photovoice process provided an *"opportunity for learning new skills"* and that it was a *"wake up call to take photos like I never did before."* Program leaders noted that completion certificates were proudly displayed in office cubicles and that learning of this new skill was described as *"a fun exercise that got a lot of engagement from the team"* and an opportunity to *"build confidence."* The photography skill building was conducted to encourage quality photographs as shared photo-stories, but also to build in a valuable skill for participants to take into their everyday lives.

The finding that skill-building was beneficial contrasts with the reviewed WASH-literature, which explicitly described not building in technical skill aspects to the orientation. Of the 32 activities identified in the WASH literature, only two discussed any form of photography skill development. Three reasons are articulated for this in the literature: 1) to avoid influencing the types of photographs that were created [41]; 2) because the process is time-consuming [48]; and 3) to avoid potential negative power dynamics related to researcher as 'teacher' [49, 50].

Acknowledging the validity of these concerns and weighing them against the potential benefits of incorporating training, we believe that the opportunity to support participants and to build into their lives a skill that extends beyond the potentially extractive bounds of the evaluation outweighs the concerns. Additionally, we did not identify any evidence of stifling creativity but saw increased creativity in photography angles and patterns–a topic covered in the training. Within our empirical case, creativity led to more interesting photo-stories and facilitated more complex and detailed gender reflections on the images. For example, how brick mold technology can remove gendered barriers to latrine manufacturing for women entrepreneurs by reducing the amount of heavy lifting required in the production process (**Fig 4**). Our training aimed to create an empowering space for participants, and no negative reflections were shared by participants around power dynamics. The orientation process could be further strengthened by engaging a local photographer for the skill training, hence reducing potential power dynamics associated with external 'expert' training [49]. In sum, where appropriate, embedding capacity strengthening activities into orientations can redress the extractive nature of research and create an opportunity for building valuable and often gendered skills.

Stage 3: Promoting ethical photography. The promotion of ethical image creation remains a fundamental consideration of the use of photovoice, and as many WASH-related topics are potentially sensitive, the importance of ethics is heightened. Wang and Redwood-Jones, describe the ethical considerations along each key stage in a photovoice activity considering privacy law [51]. They provide a set of eight minimum best practices which include multiple layers of informed consent (participants, images, and depicted individuals), ethical training, giving images back to communities, and supporting facilitators to foster ethical environments [51]. These practices have resonance with the WASH-sector and offer not only an opportunity to conduct meaningful assessment but to transform power dynamics of research and image production that can perpetuate existing power asymmetries.

Following a different ethical process situated in reflection, collaboration, and peer-debriefing, our empirical case aligned with many of the principles highlighted by Wang and Redwood-Jones. Our case employed three layers of consent: first to participate, then to share images, and informed consent from individuals depicted in images. Initial ethical training covered how to foster respectful images, and facilitators were coached through the process of promoting ethics. In reflection on Wang and Redwood-Jones' principles, two areas have emerged that could be improved. Firstly, while the images were created with the participant's own smartphones, they were not shared back with the depicted individuals. Secondly, while informed verbal consent was collected from all depicted individuals, a significant number (63%) of photographs were not shared with signed consent forms from depicted people, despite orientation training on ethical procedures and follow-up. We believe the challenges in

promoting written consent were exacerbated by the context of remote facilitation and the lack of cultural familiarity with such consent; however, a form of informal communication, such as a social media group could foster a culture which prioritizes ethics.

Within the 32 published photovoice activities from WASH-related literature, seven specifically referred to Wang and Redwood Jones' ethical best practices; yet across the activities more broadly, the description of ethical procedures was varied and often weak. Six activities did not have a description or discussion of any ethical procedures. Twenty activities described participating in an ethical board review and 13 included ethics aspects in the training procedures. Just over half of the activities described a process of initial informed consent and six described a process of obtaining separate consent to use images. Four activities provided images back to communities and three activities discussed the process with community leaders prior to starting the activities. Lastly, four activities on sensitive topics described the use of safeguarding protocols or special considerations for complex contexts.

Despite this prevalence of ethical consideration in the WASH-related literature, many of the activities focused on sensitive topics, including defecation practices, incontinence, sexual coercion, drought, water insecurity, and water conflict. Additionally, many of these activities engaged potentially vulnerable groups such as marginalized women, individuals with a disability, youth, and children. The value of engaging with marginalized individuals to create images on complex and often sensitive topics is one of the strategic benefits of participatory photography. Nevertheless, while the published documentation only provides a glimpse into the full extent of each participatory photography activity, there remains a significant opportunity to strengthen ethical considerations, especially when applying the approach in complex and sensitive contexts.

Within a framework of decolonization, one further ethical consideration could be added to existing best practices: addressing the problematic language of photography. The English language phrasing around photography is inherently problematic, with verbs such as *capture*, *take*, and *shoot* commonly associated with the action of photographing [52]. Adapting wording requires a reflexive approach to ensure that photography is not extractive or dehumanizing, and this reframing has been a valuable process even in the drafting of this manuscript.

Ultimately, the principles outlined by Wang and Redwood-Jones provide a robust framework for studies seeking to strengthen ethical considerations. These considerations are at their most critical during the image creation stage yet remain important throughout the entire participatory activity. Careful facilitation requires adjustments in language and diligent follow-up to avoid a superficial approach to ethics.

Stage 4: Reframing researcher roles.   Reflection on the examples of participatory photography activities from WASH-related literature and our empirical case highlighted the value of ensuring that photographer perspectives take precedence in image interpretation. In this sense, photographs are *"used as mechanisms to encourage deeper reflection on lived experience and, in doing so, facilitate richer personal narratives"* [41] p7]. This restructuring of the research process involves adapting the role of the researcher(s) from manager to facilitator and from interpreter to curator. A researcher as facilitator and curator helps to support participants in the process of identifying themes and bridge insights into utilization [53]. We rely on the taxonomy introduced in this article's background section to distinguish between documentary, reflexive, and collective forms of participatory photography and use these categories to describe our empirical case and the WASH-literature below.

Upon further reflection, our process was more aligned with reflexive photography in the image interpretation phase. There was missed opportunity for transformation by involving the participants in the initial identification of themes prior to the sensemaking workshop through

a community-driven data-coding process [54]. This would not only have increased the participants' connection with the results, but also could have strengthened agency.

Within the WASH-related research, aspects of interpretation, while well described, varied considerably and, in a third of cases, were misaligned with the interpretation philosophy of the named approach. Keeping with the cooperative spirit of photovoice, 19 of the activities described some form of collaborative interpretation through group interviews, workshops, or focus group discussions. Seven activities conducted interpretation in individual interviews, an approach more aligned with reflexive photography. In three activities, the researcher was primarily responsible for image interpretation, a process more closely aligned with participatory documentation.

Reframing the role of a researcher from interpreter to curator is a valuable process to ensure that images are represented and interpreted fairly and accurately. There may be cases where an additional layer of researcher interpretation is required. However, there is a rich opportunity for images to elicit further discussion and to identify further barriers and needs. Such respectful interpretation is a dialogue between researcher and participant. Therefore, researchers become curators: sorting and organizing photo-stories rather than interpreters. In summary, our analysis suggests that photography activities have more transformative potential when the researcher considers opportunities to strengthen participation by moving from instrumental to transformative engagements (see **Table 1**). This was exemplified in the literature by allowing participants to interpret their own images and reframing the researcher's role as facilitator and curator.

Stage 5: Utilizing photo-stories for advocacy. Participatory photography activities also have potential to cultivate change through the power of photo-stories, as identified in general photovoice literature, WASH-related literature, and our case example from Cambodia. Photovoice began as a feminist participatory needs assessment tool with the goal of both identifying and addressing challenges. Wang describes photographs as an *"exceptionally powerful means"* and photovoice as "a *tool for action. . .to meaningful social change"* [55 p190]. This concept aligns with the transformative research tenet of utilizing results for social change. However, photovoice meta-studies from other sectors have identified that advocacy is often undocumented in published photovoice assessments [56].

In the reflection workshops from our empirical case in Cambodia, program leaders highlighted the value of the images in shaping their own thinking and identifying tangible recommendations for future activities. One leader noted that *"details of changes. . .captured in pictures, makes people see things and impact clearer"*. Another commented that *"people could easily understand the story through photos, not just talking without any visuals"* and that "*as an outside observant it was very interesting to hear directly the stories from the point of view of the participants."* More specifically, in the photo-story depicted in **Fig 3**, the photographer described the challenges during storms of accessing latrines that are placed far from the main home. During the sensemaking workshop with the photovoice participants, safety aspects relating to weather were clarified as something to consider in the next iteration of the latrine design.

Within the examined literature, the power of images for change was strongly commended, yet little was documented about the use of photo-stories for advocacy and the uptake of results by policymakers. Notably, Bisung and colleagues identified that the photographs prompted community members to think critically about specific behaviors and practices: *"though such practices existed for long, some participants were not aware of them"* [37 p4]. Other studies described the ways in which participants were *"enthusiastic about the power of photographs to document subject matter"* and that *"community residents were automatically attracted to the photographs, animated discussions followed"* [32 p100]. Nonetheless, the movement from

images to action was missing in 10 of the 26 activities which self-identified as photovoice in the WASH literature, a trend identified in other literature studies on participatory photography [20, 24]. In seventeen examples, the use of photo exhibits, online campaigns, and workshops were documented, but the outcomes of these advocacy tools were not described. A similar finding has been documented in other writing on the politics and pedagogy of exhibiting participatory visual works [56, 57].

In summary, the weakness of many participatory photography activities in WASH has been the lack of translation of photo-stories into action in alignment with the objectives of participatory action research. This is often more difficult in circumstances where researchers, rather than community members, initiate the research. As such, the missing advocacy discussion in publications could be connected to pressure to publish results quickly or not having funding to reflect on the impact of the advocacy stage of the research. Nonetheless, there are opportunities such as gallery walls displaying printed photographs with captions, social media campaigns, websites, or in our case, a sensemaking workshop with research participants and program leadership. This also honors the efforts of participants by ensuring that their voices are heard by those who make decisions on their behalf. The emergence of innovative and digital approaches can support this process of advocacy through blogs and online forums. All advocacy approaches require considered participation to ensure true polyvocality.

Focusing on gender: Reflections on the gender-transformative potential of participatory photography

In addition to exploring the *general* transformative potential of participatory photography in, the reflection process illuminated its *gender*-transformative potential. Photovoice emerged from a feminist research paradigm, and its transformative potential remains inherently gendered [3, 23]. Gender-transformative potential is the ability to bridge practical gender needs into strategic gender interests [29, 58]. In other terms, *"meeting daily practical needs in ways that transform the conditions in which women make choices"* [58], which involves broader structural changes to gender dynamics. Kabeer argues that the gender-transformative potential of a particular intervention is connected to the rebalancing of power [58]. We now describe two facets of the gender-transformative potential of participatory photography drawn from this research and across all five stages: opportunities to address photography's patriarchal characteristics through purposeful inclusion and opportunities to foster empowerment.

Addressing photography's patriarchal characteristics through the purposeful engagement of women and other marginalized individuals. Participatory photography activities hold an opportunity to address the patriarchal and colonial characteristics of photography and smartphone use [52, 59]. This represents a missed opportunity within our empirical case, where gender parity was not achieved with our recruitment strategy. In the literature, the active engagement of women (and other marginalized individuals) created a more successful platform for gender parity. Notably, in journalistic and commercial photography, most photographers are male, and photographs taken by men are more likely to be published [59]. Additionally, colonial hunting-focused language around photography is rooted in patriarchy [52]. Previous research has identified that women and men depict different things in photographs emphasizing the importance of a diverse participant group [60]. Additionally, smartphone access is often gendered globally [61] and Cambodian women are 20% less likely (16 percentage points) than men to own a mobile phone [48]. The ability to redress the patriarchal characteristics seen in photography and smartphone use, alongside opportunities to encourage diverse viewpoints, is an opportunity for gender transformation in participatory photography activities.

Fostering empowerment for women and other marginalized individuals. Participatory photography activities also have the potential to address the three dimensions of women's empowerment as identified by Kabeer [31]: resources, agency, and achievements. This insight has been highlighted in our study and described by other studies in the public health field [9–11, 62]. Such empowerment can be fostered in situations with unequal power dynamics—such as gender inequalities [31]. Hence, empowerment can be pursued through participatory photography both for women and individuals with lower levels of historical power. Related to resources, participatory photography has addressed i) the access to and use of technology [61]; ii) social capital in the process of image creation; and iii) knowledge and skills related to assessments and photography [3]. Regarding agency, participatory photography has: i) raised critical consciousness of surrounding inequalities [62, 63]; ii) supported autonomy to direct the course of the assessment [3]; and iii) increased self-confidence [42]. Strengthened agency can occur for both individuals and groups through the research process. Finally, achievements, also known as outcomes, can be seen in participatory photography through i) the generation of insights and themes from historically underrepresented viewpoints [42, 63]; and ii) the opportunity for participants to discuss and plan future interventions and advocacy [3, 23, 63]. Empowerment is not a guarantee—as highlighted by the distress experienced by some marginalized women in short-term photovoice activities; however, participatory photography can raise the gender-transformative potential of photography-based research.

Conclusions

This article has critically explored the transformative potential and gender-transformative potential of participatory photography activities within the WASH-sector through two research components: an examination of 32 published participatory photography activities and an empirical case from Cambodia. The research analyzed the extent to which participatory photography activities have fostered transformations both '*through*' and '*from*' the process of assessment. The analysis suggested that across the five stages of participatory photography activities within the WASH-sector, transformative outcomes were often unrealized, and ethical considerations were overlooked. Nevertheless, participatory photography activities have the potential to address the goals of gender equality and social inclusion within many WASH interventions and to redress the challenges of extractive research practices. Participatory photography activities have the potential to shift the focus in ethical research from do-no-harm to doing-more-good. Researchers and evaluators within the WASH-sector and international development more broadly can foster transformative research processes and outcomes through purposeful participant recruitment, considered orientation, and meaningful advocacy strategies that leverage the potential of photo-stories for identifying and addressing inequalities.

Supporting information

S1 Data. Qualitative reflection dataset. Photovoice Reflections from Component 1: Gender-focused evaluation of a sanitation program in Cambodia. This pdf document contains qualitative data in three parts: 1) raw responses from photo-voice submission survey; 2) photovoice sensemaking workshop reflections; and 3) photovoice leadership reflection workshop. (PDF)

S2 Data. Literature database. Search strategy and included studies from Component 2. This spreadsheet includes the search strategy as an adapted PRISMA flow chart and details on 36

studies included within the systematic literature review.
(XLSX)

S1 Text. Inclusivity in global research.
(DOCX)

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