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Visual Q Methodology: A Methodological Approach to Empower Marginalized Populations in Agriculture Throughout the Global South

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Abstract

Ensuring that marginalized populations become empowered in agriculture is vital to the success of global agricultural development goals. However, these populations have reported lacking access, power, and voice. Perhaps one strategy researchers can use to address this issue is through visual Q methodology. In this methodological paper, I argue that by combining the tenets of Q and visual methodologies, researchers can offer empirically grounded findings that evoke powerful, rich insight into the perspectives of marginalized populations in agriculture who may lack the communication skills to articulate their perspectives through words. To this point, however, the approach has lacked clear guidance, which has led to diminished quality in the published literature on visual Q methodology. In response, I offer six principles to guide visual Q methodological studies moving forward: (a) relationship-building with participants, (b) participant training, (c) concourse development, (d) Q set sampling, (e) data collection, and (f) data analysis and interpretation.

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Introduction, Rationale, and Statement of Purpose

The literature on global agricultural development has been dominated by research that has focused primarily on using quantitative data to demonstrate the impact of various strategies and interventions (Meinzen-Dick et al., 2019). However, change regarding the methodological approaches used to address research issues and problems in agricultural development has begun to emerge. For example, Rubin (2016) argued that methodological transformation was underway as researchers increasingly began to use non-traditional data sources such as drawings, images, and other visual representations to demonstrate the outcomes and impacts of development approaches in agriculture. In this article, I aim to contribute to the new wave of methodological innovation occurring in the agricultural development literature by providing a rationale for using *visual Q methodology* to empower marginalized populations in the Global South who often lack the communication skills to express their attitudes, beliefs, and perspectives.

On this point, researchers in neuroscience (Azizan et al., 2006; Schlochtermeier et al., 2013) have reported that humans can process and comprehend image-based information better than textual-based. Further, images elicited a statistically significant difference regarding individuals' emotional responses compared to when the information was presented in a textual-based format (Azizan et al., 2006; Schlochtermeier et al., 2013). After reporting similar findings, Kiefer and Pulvermüller (2012) concluded that image-based information helped stimulate the affective domain of learning, which helped the participants relate to the material more intimately. Therefore, the use of images in research has the potential to stimulate greater understanding— a key rationale for the use of visual Q methodology for research on global agricultural development.

Individuals often interpret images based on what they know (Machin & Ledin, 2018). As such, images can serve as a way to amplify the lived experiences of marginalized populations in agriculture by providing a glimpse into the ways their voices, sociocultural complexities, and indigenous ways of knowing have been muted (Rose, 2022). Therefore, images can evoke understanding that may be lost in textual-based communication. Images can also be used to allow individuals to reframe their experiences in ways that can challenge, disrupt, and create change (Machin & Ledin, 2018). Or, as Weber (2008) explained, "images provoke action for social justice" (p. 46).

Although visual Q methodology has not been used extensively, with greater exposure, it could be used to answer research questions relevant to global agricultural development. To begin, I provide a description of Q methodology followed by an overview of the use of visual approaches in social science research. Thereafter, I provide a rationale for combining the two methodologies and describe the product of its application through examples. Finally, I address the inherent limitations of visual Q methodology while charting possibilities for the approach's use in research on global agricultural development.

Q Methodology

William Stephenson (1953) introduced the idea of Q methodology, often referred to as simply *Q*, in the 1930s and later provided a more nuanced perspective of the approach in his seminal work *The Study of Behavior: Q Technique and its Methodology*. Similar to other approaches, Q has been defined differently based on scholars' epistemological and ontological worldviews (Watts & Stenner, 2013). However, at its most basic level, Q can be understood as the study of individuals' attitudes, beliefs, opinions, or perspectives. Therefore, Q's best applications occur when researchers desire to understand a group's collective points of view, articulate similarities and differences in perspectives, or reject the mind-body dualism, i.e., that an individual's internal sphere can be accessed by measuring their behavior (Brown, 1980).

Although traditional quantitative research collects and analyzes data about a phenomenon through numeric data, Q challenges participants to communicate their subjective perspectives using self-referent meanings (Brown, 2000). To accomplish such, Q draws on the philosophical underpinnings of both quantitative and qualitative paradigms (Watts & Stenner, 2013). However, it should be noted that Q is not purely either; instead, it is a paradigm in its own right (Stephenson, 1953). It is through this conceptualization that global agricultural development scholars should engage with Q and begin to understand its possibilities.

A major tenet of Q methodology is concourse development (Brown, 1980). A concourse in Q is the full range of perspectives on a phenomenon in the form of statements. Each Q investigation will generate a unique number of statements during this phase. For example, Rampold et al. (2020) reported creating 235 unique statements during the concourse development phase, while Roberts et al. (2020a) generated 154 statements. The number of statements in both studies was then reduced to 36 to mitigate redundancy and participant fatigue during the sorting process (Rampold et al., 2020; Roberts et al., 2020a).

To operationalize the concourse, Q methodology can be facilitated through a novel procedure, called a Q-sort, which allows individuals to arrange their views in the form of statements onto a forced distribution printed on a physical board (McKeown & Thomas, 2013). This process begins when the researcher poses a condition of instruction, or a framing question, by which participants sort statements reflecting their views onto a forced distribution. After collecting each participant's Q-sort, researchers can generate a correlation matrix based on each participant's ranking of the statements, which helps facilitate a factor analysis. A key difference between traditional factor analysis used in quantitative research and the process used in Q is that researchers do not correlate an instrument's items. Instead, individual sorts are correlated (Brown, 1980). Through the use of this approach, factors emerge that allow researchers to examine similar and disagreeing perspectives. As such, Q can promote the expression of a sample's views on a phenomenon while providing a flexible approach to allow findings to emerge.

It should be noted that a central tenet of Q is the use of purposeful sampling to identify individuals who hold diverse perspectives (Watts & Stenner, 2013). Consequently, small sample

sizes are appropriate in Q because participants' "observational perspectives are their own" (Roberts & Montgomery, 2017, p. 154). Other unique aspects of Q are that validity and reliability have not historically been significant concerns for this methodological approach (McKeown & Thomas, 2013). As an illustration, in quantitative research, Creswell (2012) explained that reliability represented the accuracy of instruments to produce consistent results. However, in Q methodology, researchers place more importance on the replication of similar findings. For example, could participants in a similar context sort the same statements, resulting in similar factors? Because of this, Brown (1980) argued that Q only provides insight into participants' views at a particular point in time instead of being able to generalize to a population of interest. Therefore, this innovative research approach allows researchers to gain unique insights into participants' perspectives on a phenomenon.

Visual Methodologies

Research on global agricultural development has begun using spoken and written word to illuminate challenges over the past few decades more prominently (Meinzen-Dick et al., 2019). However, words can fail to capture critical forms of communication in individuals' lives, such as body movement, gestures, sounds, and the visual (Riessman, 2008). As a result, a *visual turn* has begun to emerge in the literature on global agricultural development as scholars have chosen to use photography and images to help tell the stories of marginalized populations who may lack the skills to communicate their experiences through spoken and written word (Meinzen-Dick et al., 2019). At the heart of visual methodologies is merging textual-based data and images to evoke a thick, rich description of the phenomenon (Pink, 2007).

Photovoice, photo elicitation, and visual narratives are recent examples of this new methodological wave in social science research (Riessman, 2008). At their core, visual methodologies require researchers to engage intimately with their participants to identify issues and problems in a given context (Roberts et al., 2020b; Rose, 2012). Consequently, using visual methodologies can generate opportunities for marginalized populations to actively participate and critically reflect on how they have been excluded, diminished, and silenced (Emmison et al., 2012). Through these conscious-raising experiences, visual methodologies can empower participants by ensuring their voices have been heard while also strategizing realistic ways they could create change in their social context (Mitchell, 2011).

To accomplish this, researchers using a visual methodological approach provide their participants with cameras to allow them to capture images and symbolic representations to allow others to "see through their eyes" (Pink, 2007, p. 5). Through this insight, visual methodologists (Emmison et al., 2012; Mitchell, 2011; Rose, 2012) have argued that other individuals can begin to understand marginalized populations' experiences and advocate for change. As such, visual methodologies require participants to undertake multiple roles, such as change agent, investigator, and photographer (Riessman, 2008).

Visual Q Methodology

Ensuring that marginalized populations become empowered in agriculture is vital to the success of global agricultural development (Agard & Roberts, 2020; Richardson & Roberts, 2020). However, these populations have reported lacking access, power, and voice in the industry (Richardson et al., 2023; Roberts & Edwards, 2017). Perhaps one strategy researchers can use to address this issue is through visual Q methodology. By combining the tenets of Q and visual methodologies, researchers can offer empirically-grounded findings that evoke powerful, rich insight into the perspectives of marginalized populations in agriculture who may lack the communication skills to articulate their perspectives through words.

Although visual Q has not been widely used, some researchers have advanced the methodology (Brown, 1980; Kinsey, 1993; Naspetti et al., 2016; Simpson, 1989; Stephenson, 1980). Despite this, the literature on this approach has lacked clear guidance, which has led to a lack of quality in the published literature on visual Q methodology. In response, I offer six principles to guide visual Q methodological studies moving forward: (a) relationship-building with participants, (b) participant training, (c) concourse development, (d) Q set sampling, (e) data collection, and (f) data analysis and interpretation.

Principle #1: Relationship-Building with Participants

Building relationships with participants, the first principle in visual Q research is a complex and multifaceted process that requires careful planning, ethical considerations, and ongoing effort. Effective relationship-building enhances the quality of data collected and contributes to the overall success of the research project. Researchers must prioritize transparency, respect, and ethical conduct to ensure that participants' rights and well-being are upheld.

Relationship-building with participants is perhaps the most critical phase since visual methodologies require a deep connection and commitment between the researcher, participants, and the broader community (Pink, 2007). This phase can require considerable time and follow-through (Mannay, 2015). When researchers have completed the appropriate work in this phase to build relationships, the participants will often be more open and honest about their experiences and perspectives (Machin & Ledin, 2018). These strong relationships can set the tone for the remainder of the research project (Rose, 2012). In this phase, researchers should use purposeful sampling to identify participants who hold a unique perspective on the phenomenon of interest.

Principle #2: Participant Training

The second principle, participant training, involves establishing group sessions by which the researcher explains the intent of their approach while also providing guidance to participants about fundamental photography and ethical considerations. This process can begin with an initial meeting with participants in which the researchers discuss the project’s intent and how they intend to cultivate an encouraging culture in which all participants can contribute and ask questions. These group sessions should be established early in the process to build rapport.

If possible, it can also be helpful to recruit a professional photographer to attend sessions so that they can provide insights into how to capture powerful, evocative images. The researchers should also be clear that all images that participants submit should be accompanied by a corresponding caption to help accurately convey the image's story. Regarding ethics, the researchers should be clear about what should be included in photographs and what not to include. For example, Rose (2012) noted that many researchers using a visual methodological approach ask that participants not capture photographs involving human subjects. However, Riessman (2008) argued that including human subjects can bring deeper meaning to the study. Ultimately, whether or not to include human subjects, especially the faces of the subject depicted, will be the decision of the Institutional Review Board (IRB) and the human subject present in the image.

By establishing a positive rapport with participants through regular interactions, researchers can create a culture of *encouragement*. During the relationship-building phase, researchers can inspire participants by sharing stories of visual Q can be used to empower marginalized populations. Researchers can also create a culture of encouragement by sharing recommendations about ways participants can tell their stories through images more evocatively.

Principle #3: Concourse Development

The most appropriate way to develop a concourse has long been debated in the Q literature (Lee, 2019). For example, some scholars have advocated using naturalistic approaches to understand a population's view on a topic. This approach involves collecting qualitative data through interviews, documents, and observations to create relevant statements that represent the concourse. Meanwhile, other scholars (Brown, 1980; McKeown & Thomas, 2013) have argued that a concourse can be generated from literature reviews, existing quantitative instruments, social media, blogs, and the popular press. More recently, researchers have begun to use a blend of naturalistic and other sources to create the concourse of a study.

In visual Q methodology, however, the participants should be asked to explore their local context to capture images based on the researcher's instructions during training sessions. As participants capture photographs, they should be asked to journal to record their perceptions of the experience. Researchers should specify the number of photographs and accompanying captions they wish the participants to submit during this phase. Some visual Q methodological studies published in the literature have not used this approach; instead, the researcher(s) selected images they perceived were relevant to achieve the study's purpose. If possible, I recommend avoiding this practice because the resulting images will likely lack context and may not be relevant to the participants. Therefore, participant-captured images should be considered the *gold standard* during concourse development for visual Q studies.

Principle #4: Q Set Sampling

Q set sampling involves the researcher refining the concourse by establishing boundaries to define *what matters*. Stephenson (1953) argued there was no single way to create a Q set: "[it] may be designed purely on theoretical grounds, or from naturally occurring (ecological)

conditions, or as required for experimental purposes, to suit the particular requirements of an investigation" (Stephenson, 1953, p. 223). Despite the lack of structure inherent in Stephenson's (1952) position, Watts and Stenner (2012) suggested that researchers examine the concourse against their research question(s) to determine their relative *fit*. Therefore, a clearly defined research question can help set parameters regarding what images from the concourse should be mobilized for further use.

One contemporary technique used to create the Q set is using a naturalistic approach and operationalizing the resulting categories as dimensions (Richardson & Ramlo, 2020). However, Stephenson (1978) and Sylvester (2020) advocated for using Fisher's balanced block design (see Table 1) to classify the Q set—a more quantitative-oriented approach. To accomplish this, Stephenson (1978) opined that the components of the concourse could be categorized in the following way: (a) feelings—ranging from pleasure to unpleasant, (b) morality—ranging from positive to negative, and (c) reality—ranging from realistic to unrealistic. Creating the Q set through this approach would be similar to quota sampling in quantitative research by which researchers seeks to obtain a diverse sample regarding demographic variables. A visual Q set, however, is a sampling of images, and no population exists by which it could be designed or benchmarked. Because of this limitation, researchers could also use pre-existing theories as a basis for the categories by which to generate the visual Q set (Watts & Stenner, 2012).

Table 1

Fisher's Balanced Block Design

Causes	Effects	
A. Feeling	Pleasure	Unpleasure
B. Morality	(a)	(b)
C. Reality		
	Positive	Negative
	(c)	(d)
	Realistic	Unrealistic
	(e)	(f)

Note. Table adapted from Stephenson (1978).

One major issue that researchers often struggle with is how to know when the concourse is complete. On this point, Eden et al. (2005) explained that concourse development should be treated similarly to a qualitative analysis by which researchers stop once *saturation* has been achieved, i.e., when images and captions become repetitive and do not add new insights. Therefore, this element of concourse development has often been considered a *judgment call* by researchers influenced by experience and resource constraints (Eden et al., 2005). Although the number of images to include in the visual Q set can vary considerably, most will have between 20 to 60. Time and other potential challenges should also be considered when determining the visual Q set. Therefore, conducting a pilot study could help refine the Q set.

Principle #5: Data Collection

After establishing the Q set, researchers should ask the participants to sort the images on a forced distribution of negative to positive integers. Brown (1980) described this process as "the technical means whereby data are obtained for factoring" (p. 7). The images should be sorted based on the *condition of instruction,* or a framing question the researcher poses. Table 2 provides instructions for facilitating this process through seven steps.

Table 2

Seven Steps to Facilitate the Collecting of Data in a Visual Q Methodological Study

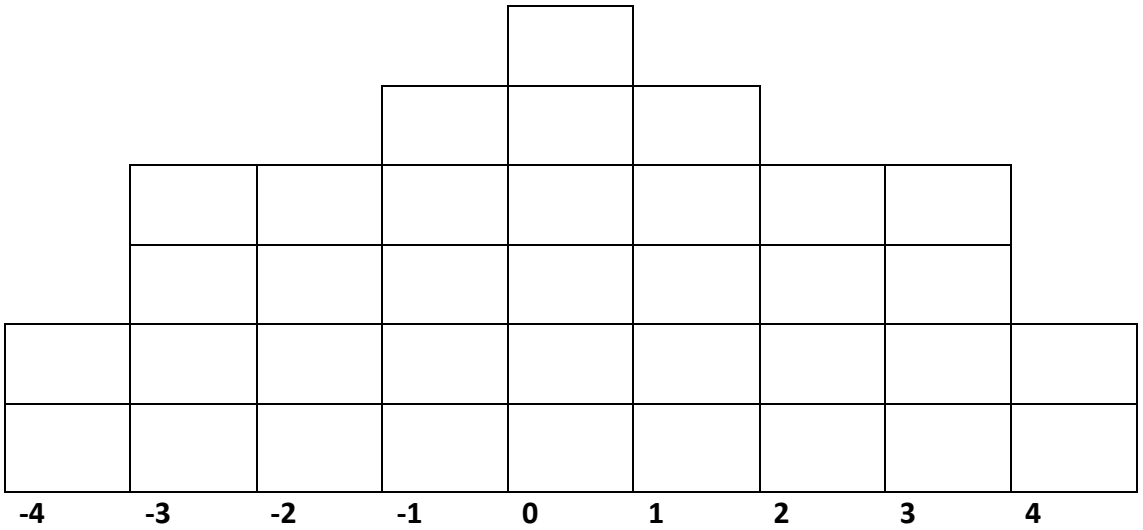
Step	Example Instructions
1. Present the Condition of Instruction and Pre-Sorting	• "Read each caption and sort the images into three piles using the question: 'What are your thoughts on women's roles in agriculture in Sub-Saharan Africa?'" • "Pile the images **most like you** on your right and **least like you** to your left. Then, put images you **do not feel strongly about** in the middle pile."
2. Initial Positive Rankings	• "Now review your **most like you** pile. Begin to place the images onto the far right columns of the forced distribution. Fill in the rest of the right side of the forced distribution with the images that are most like you."
3. Initial Negative Rankings	• "Now review your **least like you** pile. Begin to place the images onto the far left columns of the forced distribution. Fill in the rest of the left side of the forced distribution with the images that are "most like you."
4. Complete Rankings	• "Now that most of your images are placed on the left and right columns use the remaining images to fill out all spaces on the forced distribution."
5. Reconsider Rankings	• "Now that you have placed all images on the forced distribution, go ahead and rearrange any images until you feel the forced distribution accurately represents your view."
6. Capture Rankings	• Record the positions of the images on the forced distribution.
7. Post-Sort Interview	• "Would you mind walking me through your thought process for why you placed the images the way you did?"

An example condition of instruction for a study on global agricultural development could be: "What are your thoughts on women's role in agriculture throughout Sub-Saharan Africa?" The participants could then sort the images using a rank order of their preference, from most *unlike*

me to most *like* me, on a forced distribution. The use of forced versus free distributions has long been a point of discussion in Q methodology (Watts & Stenner, 2013). Despite this, the use of a forced distribution in Q has emerged as the most prominent approach because "it permits a fully commensurate and less ambiguous comparison of Q sorts… [or in other words]… it provides data in a more convenient and processed form" (Watts & Stenner, 2013, p. 51). Figure 1 provides an example of a forced distribution for a study using a 36-image Q set, with array positions ranging from -4 to +4.

Figure 1

Example of a Forced Distribution Used for a Visual Q Investigation



It should also be noted that after completion of the sort, Q researchers should conduct a post-sort interview to gain deeper insight into why participants ranked images the way they did. The type of interview approach used can vary. For example, focus group interviews could help participants make sense of and assign meaning to how they sorted the images collectively (Rose, 2012). However, researchers could also employ one-on-one interviews to allow meaning-making to occur independently (Riessman, 2008).

Principle #6: Data Analysis and Interpretation

The final stage, data analysis and interpretation, begins after the participants have completed sorting images. The product of the process, the *Q sort*, can then be analyzed using a combination of computer software and naturalistic processes to emerge an interpretation of the data. Multiple computer software programs, e.g., KenQ, PQMethod, and Q Factor, exist to assist researchers with analyzing Q sorts. For example, all major Q analysis programs can input and analyze data through factor analysis. However, it should be noted that factor analysis does introduce a level of subjectivity into the analytic process because decisions must be made regarding how to rotate the factors and which to retain to emerge relevant findings.

Because of this, some scholars (McKeown & Thomas, 2013; Stephenson, 1953) have made a case for selecting factors on a theoretical basis rather than a statistical one. As an illustration, through analysis of factor loadings, a researcher may discover an individual would have provided a theoretically important sort but loaded significantly on another factor. Through this discovery, the researcher could facilitate a manual rotation of the factors to examine whether their initial hunch could be explained differently. It should also be noted that an automated factor rotation function exists within most Q statistical programs, called Varimax. Varimax rotates factors on a statistical basis; however, describing the factor may prove difficult because the resulting product often lacks a theoretical basis. Nevertheless, because of its ease of use, Varimax rotation is often a good entry point into Q analysis for beginning researchers (Watts & Stenner, 2012). Table 2 provides an example of a factor matrix using a varimax rotation from a study published by Roberts and Montgomery (2017) that had a three-factor solution regarding school-based agricultural education teachers' epistemological positions.

Despite the rotational approach used, factor analysis in visual Q allows researchers to group sorters through their shared viewpoints based on their sort's correlation to factors. As a result, sorters that correlate highly and significantly with a factor, but do not load significantly on another factor, are described as *defining* that particular factor. Using sorters who define the factor, an average score can be computed, and researchers can understand the dimensions that constitute each factor. At this point in the analytic process, however, the factors exhibit no meaning besides grouping individual sorters, and as a result, they persist as numerical abstractions until further interpretation.

Q data analysis programs provide various statistical outputs that can help researchers at this stage with additional interpretation. Here are a few statistical outputs that Mauldin (2012) recommended considering to aid in the interpretation of factors: (a) correlations between factors, (b) Z-scores differences, (c) distinguishing and consensus images for each array, and (d) participant demographics. Despite such recommendations, the Q literature provides little guidance on how much weight each statistical output should be given when making a final interpretation of factors. Typically, through deeper analysis, the researchers emerge a name for each factor and describe it through a narrative that weaves images along with direct quotes from participants' post-sort interviews and journals. Table 3 offers practical recommendations to facilitate the interpretation of visual Q findings.

Table 3

Facilitating the Interpretation of Visual Q Findings

Stages	Explanation
Examine the Highest and Lowest Z-scores (positive and negative)	• Although some researchers only examine Z-scores that are 1.0 or above, z-scores within three columns (positive and negative) should be considered
Examine Consensus and Distinguishing Images for Arrays	• Ensure all consensus and distinguishing images that were statistically significant are considered. These outputs can be beneficial when understanding how factors are different yet similar
Assign Provisional Factor Names	• Trying out provisional factor names at this stage can help you describe what you observe in the data. You can always revise the names later, but this practice can aid in sensemaking
Consider Post-Sort Interviews, Journals, and Participant Demographics	• By considering emergent qualitative findings in concert with Q output data and participant demographics, similarities and discrepancies can become more visible
Create Factor Mock-ups with Data Support	• Use factor array positions and Z-scores to create an ideal sort. This process can help you understand how the images fit together holistically for each factor • Consider potential themes or concepts that can help you describe each factor
Finalize Factor Names and Interpretation	• Based on the data available and your interpretation of such, finalize the names of the factors and how you will describe each with the support of data

Note. Interpretation recommendations used to create this table were adapted from Mauldin (2012).

Conclusions, Discussion, and Recommendations

Ensuring a safe and inclusive food system throughout the world will be critical to furthering global agricultural development (World Bank, 2023). However, the ability to achieve such has been compounded by issues such as extreme poverty, disease, water scarcity, and other wicked problems that oppress already marginalized populations even more (Fuglie et al., 2021). Consequently, it has become critical to understand the perspectives of these marginalized populations in agriculture so the industry can respond to their needs better (International Fund for Agricultural Development, 2023). Visual Q methodology could be one approach used to achieve this aim. As such, visual Q methodology has exciting possibilities for social scientists focused on global agricultural development issues.

However, the methodological approach also has several complexities that researchers will have to learn to navigate. For example, visual Q will take considerable time and resources in the field to complete effectively. Because many marginalized populations in the Global South lack access to technology and the internet, web-based options for data collection will likely not be an option for the foreseeable future. Consequently, I encourage greater debate about visual Q's utility for global agricultural development. Further, I recommend that researchers focused on global agricultural development explore whether their line of inquiry could support the use of this approach.

Although the method has inherent limitations, it allows researchers to be flexible enough to adapt to contextual-based challenges while employing a creative, thought-provoking methodology. Despite the intensive nature of visual Q, it can be accomplished with relatively small numbers; for instance, 15 to 30 participants would be enough to achieve quality results. As such, the method could be adapted to be more cost-effective. Also, because multiple forms of data (e.g., Q-sorts, photographs with captions, interviews, and journals) are collected during a visual Q study to triangulate findings, the qualitative data sources could serve a dual purpose by providing data for additional publications.

Finally, it is important to note that visual Q studies could also help enact policy change. On this point, Steelman and Maguire (1999) explained that because images can be powerful tools that can change individuals' perspectives, the findings of visual Q studies could help open policymakers' eyes to the realities of the challenges that marginalized populations in the Global South face.

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