An Analytical Tool for Visual Data Analysis: Application to the Mmogo-Method®

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Abstract
An analytical tool that enables experienced researchers and non-experts to analyse participant-created visual data has so far remained underexplored. Existing frameworks to analyse participant-generated visual data tend to use selected theoretical frameworks, guided by participants’ interpretations, to generalise results, test hypotheses, or to identify representational meanings. Analyses of visual data as separate units employ mainly content analysis or (social) semiotic analysis. This article presents a tool for conducting a systematic and transparent analysis of image-based research data by adopting an empiricist and pragmatist approach. We designed a step-by-step procedure to guide researchers individually or in a group to conduct an analysis of such data. Our prototype—which we named Created-Image Data Analysis (CIDA)—was developed by applying design-based research. The CIDA tool consists of five phases, each with an analytical focus and operational questions. Phase 1 covers the basic information; Phase 2 examines the elements and organisation of the visual representation; Phase 3 analyses its logic or cohesion; Phase 4 interprets meaning; and Phase 5 concludes with an evaluation. We applied CIDA to an example of visual data obtained by applying the Mmogo-method in which participants use materials such as clay, dried grass stalks, and beads of different sizes and colours to respond to a researcher-introduced prompt. The CIDA tool is applicable to all static participant-created visual data obtained during research, but it has not yet been tested for analysing moving image-based data. The tool qualifies as heuristic; it offers a systematic procedure to guide an analysis with data-grounded interpretations. The analysis is replicable and open to scrutiny. When the findings from the textual data are considered in combination with the participant-created visual data, the trustworthiness of the interpretations of these datasets is enhanced. This analytical tool enables a rigorous procedure applicable to visual data across subject disciplines and for different research purposes.

Keywords
visual data analysis, created-image data analysis, analytical tool, design-based research, participant-generated, Mmogo-method

Introduction
Visual data generated by participants in a study can assist researchers to obtain deeper or more vivid understanding of the social meanings in the material produced. These data may be acquired, for instance, when participants draw or paint or produce photographs or when they create forms from clay in response to researchers’ questions or directions. Despite the abundant use of such material in social sciences studies, the processes followed to analyse it are not always easy to apply, lack a guided analysis or are inadequate for the range of participant-constructed data. We present an analytical tool that offers a consistent procedure, applicable across subject disciplines and for different research purposes, to guide the systematic, transparent, and replicable analysis of participant-generated visual data. The knowledge obtained by using this tool could then be used with knowledge gathered from a separate, independent, but similarly rigorous analysis of textual data collected in the study. The article sets out first to present existing methods to analyse participant-created visual data indicating the need for an analytical tool for use by

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researchers with varying analytical skills, across subject disciplines, and with a clear procedural application. Second, it describes the development and presentation of the analytical tool (CIDA), adopting an empiricist and pragmatist approach, using design-based research. Three, the article applies CIDA to data obtained from the Mmogo-method, a visual data-collection method. The article concludes with a discussion, limitations, and ethical considerations. Next, we present a brief overview of existing visual data analysis methods and theoretical frameworks.

Methods to Analyse Participant-Created Visual Data

Analytical approaches to visual data created by participants could be guided by a specific theoretical framework, participants’ involvement, to generalise results, and test hypotheses, or to identify representational meanings.

Drawing on a theoretical framework to analyse participant-created visual data is illustrated by Liebenberg (2009) who used grounded theory’s sequential coding phases. Other examples of theory-driven analytical approaches include discourse analysis, a feminist approach, a psycho-analytic approach, or a semiotic approach (see Capous-Desyllas & Morgaine, 2018; Liebenberg, 2009; Theron et al., 2011; Van Leeuwen & Jewitt, 2001). Application of a selected theoretical framework or approach to the analysis of visual data obtained from participants’ creations often limits the analysis to the boundaries of the selected framework.

Participants’ involvement in visual data analysis vary. In some instances, participants are actively involved in the analysis through a “dialogical process around the image” (p. 60) (Liebenberg et al., 2012) or through collaborative writing (Mitchell et al., 2011). The analysis of such created-image data also relies mostly on the analysis of the language or transcribed textual data verified by participants in a process of member checking: participants get the opportunity to correct misinterpretations that may result from the researcher’s analysis or to provide additional information (see Koelsch, 2013), thereby contributing to the trustworthiness of the findings (Lincoln & Guba, 1985). The problem, however, as Morse (2015) argues, is that member checking is often impractical; it can also be difficult for participants, who may struggle to recognise their own material once it has undergone analysis at higher levels of abstraction. Analytical approaches to visual data without relying on participants’ accounts or interpretations of the material they have created is, however, limited.

Existing procedures using visual data as a separate unit of analysis are usually applied to generalise results and test hypotheses (Bell, 2013), or to identify representational meanings (Jewitt & Oyama, 2013; Van Leeuwen & Jewitt, 2001). They are often orientated towards the analysis of art, culture, and literature, but with little practical relevance to conducting a systematic analysis of the visual data as a separate unit of analysis from an atheoretical broad perspective, with no participant involvement. To this end, our search for an analytical tool was guided by the following questions: What analytical tool could be used by inexperienced as well as experienced researchers, and without requiring extended knowledge of, for instance, arts, psychoanalysis, or semiotics? How can this analytical tool be applied by researchers individually or in a team? What procedure is needed to lead researchers step-by-step from identification and description to interpretations and conclusions; contain the logic of incremental understanding of the representation; and be accountable for the groundedness of (competitive) interpretations and conclusions?

Development of the Tool

We adopted an empiricist and pragmatist approach, drawing on design-based research principles as proposed by Koskinen et al. (2011). The analytical tool was developed in the context of mutually informing processes of applying VDA theory and iterative user-centred feedback (see also Michel, 2007).

Design-Based Research

This tool has been constructed using design-based research which draws on the epistemological aim to create artefacts, products, tools (analytical), services, interventions, and systems that respond as well as possible, to the needs of the intended end users (Gregor & Hevner, 2013). Design research is an iterative process and, for our purpose, three phases have been applied (see Hevner, 2007; McKenzie & Reeves, 2019; Plomp & Nieveen, 2013; Van den Akker et al., 2006). Phase 1 consists of four steps. In Phase 2 cyclical processes are applied to develop the tool through feedback and continuous revisions; and Phase 3 deals with the assessment and dissemination of the tool. A visual representation of the process is presented in Figure 1.

Phase 1: Develop Initial Tool. We applied four steps in this phase to analyse users’ needs and context, and literature search and assessment.

Step 1. Analyse the Needs of the Intended Users. We required an analytical tool inclusive of several approaches that focused on image-based data as a separate unit of analysis; that is systematic (follows a set procedure) and easy to use; that relies on the observations of an individual researcher or a team of (co-)researchers; and that is transparent (open to scrutiny and verification). We identified the requirements for the tool and defined them as being:

- adaptable to varied approaches, focusing on image-based data, systematic, and easy to use;
- reliant on the observations of an individual researcher or a team; and
- transparent.
Step 2. Analyse the Context. We needed an analytical tool for:

- application to an academic and research context;
- use by inexperienced as well as experienced researchers; and
- not requiring extended knowledge of, for instance, arts, psychoanalysis, or semiotics.

Step 3. Consult literature. Development of the analytical tool began with a literature search using the following concepts: visual methodologies, arts-based research, visual research, arts-informed research, visual arts methodology, image-based (data) analysis, and visual meaning-making.

Step 4. Assess literature. In design research, an extensive and systematic account of sources is uncommon because the approach is mainly heuristic. To this end, we selected literature covering a compendium or broad overview of different VDA approaches, and that offered practical instructions to guide a detailed analysis, would be generally useful and extend the boundaries of a specific tradition (e.g. psychoanalysis, arts, literature, ethnography). We applied the following selection criteria in identifying the literature to develop the tool: exclude theoretical elaborations; include literature relevant to the intended use (e.g. video analysis insufficiently relevant; aesthetic analyses of art partially relevant; literature on photographic elicitation rejected); include components applicable to an interdisciplinary setting; and, from an empiricist and pragmatist approach, include literature with components that would contribute to the development of a practical analytical tool for VDA.

The identified sources were mostly theoretically orientated manuals with very little practical instruction for performing VDA. We scrutinised the literature for VDA of participants’ experienced social meanings in the natural context in which they occur, which we called social framework use. This framework excludes visual data obtained for therapeutic or documentary purposes or for aesthetic assessments. In other words: the image and its analysis are not intended to cure a participant or present a fluent visual story. Participants’ assessment of the inherent beauty of the image is also irrelevant. For this reason, two guidelines informed the selection of components for the analytical tool:

- First, theory and methodology of VDA to delineate the boundaries of the analytical tool (see Banks, 2001; Bohnsack, 2008; DiBartolomeo et al., 2015; Drew & Guillemine, 2014; Grady, 2008; Emmison & Smith, 2007; Knowles & Cole, 2008; Liebenberg et al., 2012; Lynn & Lea, 2005; Mason, 2005; Theron et al., 2011).
- Second, components that are useful and practically orientated (see Margolis & Pauwels, 2011; Mitchell, 2008, Rose, 2016, Schnettler & Raab, 2008, and Van Leeuwen & Jewitt, 2001) for a comprehensive discussion.

We used the findings from Phase 1 to develop a first draft of the analytical tool.

Phase 2: Improving the Tool. The development of the tool entailed cyclical processes (see Koskinen et al., 2011). The analytical tool was first presented to experienced researchers in VDA to obtain feedback from several collegial discussions. The tool was applied 12 times in two countries (South Africa and The Netherlands) with postgraduate social sciences students—four groups in South Africa and eight groups in the Netherlands. Groups varied in size from six to 15 students. Student groups provided user feedback as part of their academic curriculum to practise data analysis; the discovery of new knowledge through research forms part of the mandate in a tertiary education setting. We provided the various groups with different examples of participant-constructed data but applied the same analytical procedure. We removed all identifiable information from the data examples and requested the student groups to treat the information shared in the groups as confidential. Ethical permission to use feedback from the (anonymous) users to improve the tool-in-progress was not obtained because the focus was on developing the tool for the purpose of...
analysing visual data. Groups discussed the applicability of the analytical tool critically and suggested revisions. Subsequently, we revised every phase of the analytical tool three times to ensure that it enabled a focused, guided analysis. Finally, we evaluated the tool against the requirements set out in Phase 1 and we named it: Created-Image Data Analysis (CIDA).

Phase 3: Assessment and Dissemination. In this article we present a semi-final tool for CIDA in Table 1. We invite researchers to use the tool and to provide their feedback, which will inform further revisions.

The CIDA tool consists of five phases, each with an analytical focus and operational questions (see Table 3). Phase 1 covers the basic information; Phase 2 examines the elements and organisation of the visual representation; Phase 3 analyses its logic or cohesion; Phase 4 interprets meaning; and Phase 5 concludes with an evaluation. In applying CIDA, we suggest the following procedure.

- Not all the CIDA elements may be relevant for every image-based dataset, because of the general and inclusive nature of the analytical tool. Every entry should be completed step-by-step, systematically, and meticulously. If an entry is irrelevant, indicate this as ‘Not applicable in this case’.
- Carefully, closely, and repeatedly observe the image-based data.
- Analyse one image or one case at a time. In multiple cases, apply CIDA multiple times. The number of repetitions depends on the level of saturation. The analysis is completed when it is possible to provide a satisfactory and theoretically sound answer to the research question (Timmerman et al., 2019).

Example of Mmogo-Method
Participant-Created Visual Data

Exploration of meanings in social phenomena and often hard to address topics (e.g. relational experiences, loneliness), particularly in contexts of diversity such as South Africa, required a novel approach to collecting data. The Mmogo-method® was developed as a data-collection tool to obtain thick, detailed and layered visual, textual and observational data (see Roos, 2016a). It is a relationally and context-sensitive focus group method (see Barbour, 2014; Chilisa, 2020), focusing on creating an optimal interpersonal space for data collection that enables research participation irrespective of participants’ or researchers’ background (socio-economic or socio-cultural) and by its composition and application provides a transformative context. Since its development in 2002, the method has been applied in more than 30 different research topics (social science, environmental science, community psychology, youth studies, socio-gerontology), thereby demonstrating its applicability across subject disciplines and contexts (Dlamini & Tesfamichael, 2021; Liebenberg & Theron, 2015; Malpert et al., 2017; Romm, 2018; Theron, 2016).

The Mmogo-method: Participant-Created Visual Data

Visual data from the Mmogo-method are obtained from participants’ visual representations and descriptions. We applied due diligence in obtaining informed consent from participants before data collection and in order to be able to use the data for future purposes, in this instance to develop an analytical tool.

In applying the method, eight to 10 volunteers seat themselves in a circle. For optimal interaction, norms are introduced, such as transparency and predictability, and, by way of introduction, participants are informed what will be expected of them; how the group will be involved, and that

Table 1. Created-Image Data Analysis (CIDA) Analytical Tool.

| Phase | Analytical focus |
|-------|------------------|
| 1 Basic information | Initial impression, Representation, Identification, Producer context, Reason |
| 2 Elements and organisation of the representation | Form and composition, Content, Quality, Observing the representation and describing logic, Connections and coherence, Prominent details and relevance, Symbolism |
| 3 Analysis of the logic/cohesion of the visual representation | Summary, Understanding, Meaning, Interest, Validation |
| 4 Interpreting the meaning | |
| 5 Evaluation | |
Table 2. Visual Representation With Verbatim Explanation of a Young Man’s Experiences in Relation to Older Persons.a

Verbatim translation of discussion

R | What did you make?
YP2 | I just made a place where we keep livestock, cows, and chickens. So, this is a person who takes care of the cows, who milks the cows and who feeds them. Here is the gate. He just put them inside and he is about to close the gate. It is like when you enter Khuma, next to the police station, on the left-hand side, there are some farms there, but nowadays there is no place for people of the past days.

R | Why did you make these objects when we asked you to make something about older people?
YP2 | I made it because if you look at our lives, we are no longer focused on agriculture things. We are thinking of going to school, pursuing positive (self) care—forgetting about our roots. That is the motivation for this.

aVisual representation and verbatim explanation reprinted by permission from Springer. The Mmogo-method and the intergenerational group reflecting technique to explore intergenerational interactions and textual data analysis (Roos, 2016b, pp. 93–94) and Theorizing from the Mmogo-method: Self-Interactive Group Theory (SIGT) to explain relational interactions (Roos, 2016c, p. 160).

Figure 2. Visual representation by a younger Setswana-speaking man.

consequently confidentiality can be ensured only partially. They are assured of unconditional acceptance, which means that participants or their visual constructions will not be judged in any way. Following the introduction, participants—for example, in this instance, young men—are provided with materials (malleable clay, beads of different sizes and colours, and dried grass stalks) to construct representations, as invited by the researcher: With the material in front of you we would like you to make anything that reminds you of the older persons in your community. On completion of all the visual constructions, the researcher asks for a volunteer to initiate the exploration phase by explaining his or her representation. Group input is invited as soon as the discussion between the researcher and the participant allows. The process is repeated for all participants. All recorded conversations are transcribed verbatim and analysed. The visual representations are photographed from different angles. These photographs are analysed as visual data. At the end of all group discussions, participants tell the researchers how they experienced participation in the study. Everyone shares refreshments, and researchers approach participants individually to give them the opportunity to express any lingering emotional content. When the participants have left, researchers discuss the impact of the research, which serves as debriefing and provides a further layer of data collection.

The visual data obtained from the Mmogo-method provide detail about the social meanings of participants that formed as they related and interacted with the social and material world, drawing on Blumer (1969). Analysis of the visual data obtained from the Mmogo-method is based on the assumption that nothing in the shape, selection of the colour of the beads, or the structure of the configuration of the visual representation is meaningless, accidental or random.

Example of the Mmogo-Method in Applying CIDA

In applying the tool, we selected participant-generated visual data that we had obtained using the Mmogo data-collection method. Visual data were obtained from Setswana-speaking younger people about their experiences of their relationships with older persons in a rural village Khuma, South Africa. Research on intergenerational relational experiences with Setswana-speaking people in rural South Africa had been conducted mostly with segregated generational groups, using interviews, focus group discussions or the Mmogo-method. Findings indicated ineffective relational interactions between related and unrelated older and younger Setswana-speaking people in rural South Africa. Older persons perceived younger people as stubborn, disobedient, and disrespectful, while younger people experienced older people as rigid, demanding, and sometimes abusive (Chigeza et al., 2021). Intergenerational interactions around mobile phone and generational expectations of giving and receiving care confirmed unsatisfactory generational experiences and perceptions (Roos & Robertson, 2019; Roos, et al., 2017). Yet it was unclear what actually occurred to activate social power and explain what deeper social structures were involved in the relational dynamics between older persons and younger people, particularly in a traditional, rural community.

It was therefore decided to invite unrelated older and younger Setswana-speaking people from the same rural community to participate in the same research context. Older and younger people participated as two separate groups in the intergenerational group reflecting technique (IGRT) (Roos, 2011; White, 2000) in combination with the Mmogo-method. In applying the IGRT, one generational group first assumed an active listening position while the other generational group described their experiences in relation to the listening group.
Table 3. Guiding Questions to Conduct a Systematic Visual Data Analysis (references are listed at the end of this article).

| Phase          | Analytical focus                  | Operational questions                                                                 | Demonstration                                                                                                                                 |
|----------------|-----------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Basic information | Initial impression                | Does the representation create a particular mood? Name it instinctively before analysing it | A big stick in the hand of a person with arms outstretched, who is facing one of the animals                                                  |
|                | Representation                     | What aspect of the representation elicits this mood?                                    | Not applicable in this case                                                                                                                  |
|                |                                    | Does the picture have a title? If so, who gave it?                                        | (Formal) It is a white clay artefact placed on a brown, circular cloth on a table, viewed (photographed) from above                           |
|                |                                    | Are there collateral texts explaining the pictures, and if so, who provides the explanation? | (Substantial) A scene of a kraal (a manmade structure to keep animals inside and to protect them from outside dangers) with animals and guardian cowherd |
|                | Identification                     | What does the image (roughly) show? For example, does it include figures or a landscape? | Not applicable in this case                                                                                                                  |
|                | Producer context                   | Who constructed the representation?                                                      | A Setswana-speaking man (aged between 20 and 25 years) who voluntary participated in the Mmogo-method in relation to: 1) an open-ended research prompt (With the material in front of you we would like you to make anything that reminds you of the older persons in your community); and 2) in relation to unfamiliar older persons (men and women) who assumed an active listening position as part of the IGRT. |
|                |                                    | Where and when?                                                                         | A rural community in South Africa, Khuma, in 2011. The data were collected in a communal hall easily accessible to all participants. The venue was equipped with tables and chairs. Apart from the 10 younger and six older participants, a research team consisting of eight members was part of the data-collection event |
|                | Reason                             | Why was the representation constructed?                                                  | Visual data are used in combination with the IGRT involving two generational groups in the same context to move beyond the descriptive to explain deeper social structures that inform strained intergenerational relations |

(continued)
Table 3. (continued)

| Phase | Analytical focus | Operational questions | Demonstration |
|-------|------------------|-----------------------|---------------|
| 2 Elements and organisation of the representation | Form and composition | Describe all elements, the lines, shapes, spaces, forms, colours, texture, and lightning | Description |
| | | - In an almost closed circle (kraal), there are four objects: two animals, a person (gatekeeper/caretaker—apparently a man), and a closed, rectangular space with approximately 30 colourful small objects |
| | | - The big circle, formed by 28 grass stalks (same size as the person), has a gate opened outwards |
| | | - In the entry (or exit?) a person is standing (astride), more inside than outside, holding an enormous stick and facing the animals (looking into the kraal) |
| | | - One of the animals is gazing at the person with the stick; the other has turned its back to the person and is feeding from a trough. One of the animals has its head up, the other down |
| | | - Person and animals are standing upright and they all have black eyes (beads) |
| | What is the point of view (POV) of the representation? From above, below, or at eye level? A particular perspective! | POV: The maker (being seated) could view the artefact from a horizontal and from a vertical angle; the spectator only vertically |
| | Describe the composition: What is included, deliberately portrayed, or omitted? | Composition: The artefact has been made meticulously but is confined to the basic visual elements of the scenery. It has no context nor a place in the world: it is concentrated on what is happening inside the kraal |
| | What is in the centre, the foreground, the background, on the periphery? | The representation is placed in such a way that the man forms the central focus point. From that position the eyes of the spectator are drawn (by the line of the stick) to the animal opposite. The animal at the trough is situated on the periphery of this central scene. The composition defines the main characters and the relative outsider(s)—the ‘uppers’ and the ‘downer’ |
| | Placement of individual objects: Close, distanced, symmetrical, or asymmetrical? | Contrast (substantially) the representation has four striking contrasts: (a) open/closed or in/out; (b) man–animal; (c) threat (stick), peace (eating) and in-between (staring); and (d) high or up (man, stick, wall, head)/low (animals, tails, food, heads). Formally the figure is clear and has sharp lines and boundaries (white on a brown background) |
| | Contrasts: High/low, inside/outside, light/dark, soft/rough, old/modern, uplifting/down, human/animal, and so on | Overall: we witness an ongoing action, not a state. Rhythm: The artefact has a calm and balanced rhythm; the objects have space around them, and are equidistant; the circle (of attention) encloses an isosceles triangle (of main characters) |
| | The overall design of the representation: visual rhythm (repeated elements), balance (symmetry and asymmetry), movements (suggestions of action), variety (differences and contrasts), proportions (the size relationships among the parts) | It is a traditional scene of a kraal with a person (man), his back to an open gate and facing an animal opposite; he has a threatening attitude and is holding an exceptionally big stick in his right hand |
| Content | Describe the setting, place, time, situation of the representation | The presentation depicts a realistic story or an event. If the person were left out, there would be no story |
| Quality | Is it abstract, realistic? Does it depict a situation, a process, an activity or (e.g. a fantasy? | Not applicable in this case |
| | What is the quality of the image (clear, blurred, indistinct); is it complete (no essential elements missing), is the picture ‘polluted’ with elements that seem not to be relevant (e.g. photographs with accidental, unintended elements in the background)? | |
| | Is the picture good enough to be analysed or are there serious omissions, imperfections, unclear elements, and so on? |
| Phase | Analytical focus | Operational questions | Demonstration |
|-------|-----------------|-----------------------|--------------|
| 3     | Analysis of the logic/cohesion of the visual representation | Observing the representation and describing logic | What observations can be made when viewing the representation from different perspectives? What changes when alternative perspectives are changed? Which elements in the representation are emphasised? Is there a narrative or dynamic? | Viewed from the perspective of the feeding animal: A domesticated animal focused on eating food from the food trough; not involved in what is happening behind it; it focused on the ground, food, and the wall. From the perspective of the animal facing the man: opposing the person who is inhibiting the possibility of escape from an enclosed space. Its attitude is rather blank: Not aggressive and not preparing itself to jump or attack—inwardly oriented. From the perspective of the person: Submission of the animal opposite by means of imposing fear—emphasised by the big cowherd’s stick. In contrast to the animal, the cowherd is taking action and is ready to strike. What is the internal order or logic? The internal logic is the logic of care/protection and domination/disciplining: The intention in this traditional enclosed space is to keep the livestock safe. There is food to care for animals, a caretaker who is responsible for the animals and their protection; and there are two kinds of animals—one compliant with what is expected of animals (head down) and one opposing the norm of what is expected of it (head up). A double message is communicated: On the one hand, of caring and controlling and of feeding and protecting, while on the other hand, of imposing discipline and taking away freedom. Such a combination contains two contradictory messages simultaneously, which could result in distress (neurotic conflict) for those on the receiving end of such an impact. |
| Connections and coherence | Reduce categories of the described characteristics to main points of interest | What seems to be the theme of the representation? Connect the described characteristics in larger patterns, in coherent interrelations | There are three intertwined oppositions - Freedom or captivity - Domestication or escape, obedience or confrontation; and - Protection or harm |
| Prominent details and relevance | - Are there remarkable details? - Are there internal inconsistencies? - Are there parts that your eyes are constantly drawn to? - Have any parts been exaggerated or distorted? | To decide what is remarkable, the request prompting the visual construction ought to be kept in mind. In this instance it was: make anything that reminds you of the older persons in your community. In response, this participant did not construct anything that refers to the honour, excellence, authority, wisdom, virtuousness, etc. of older persons (plural) but rather a scary scene of one man with a huge stick. Why? Given the possibility of choosing any theme, this one must have a lived urgency for the maker of the visual image. Moreover, the overall picture leaves little room for misinterpretation: it is an in-your-face representation with no vagueness, no complex hinting, and no subtitles. Nevertheless, the evident and straightforward simplicity is probably misleading: The picture draws us into a dramatic episode containing a puzzle: What is going on here? |
| Symbolism | Are there visual elements that represent one or more (complex) ideas? | The axis of the representation is a confrontation in relation to an animal that seemingly does not comply, but instead is opposing the man (caretaker) directly. They seem to be relating with the potential of imminent conflict. The means to stop the other is a stick, which represents the language of violence. The intentionally big size of the stick emphasises the man’s domination over the animal(s). The sticks surrounding the kraal are positioned to prevent animals from escaping but also to protect them against dangers from outside (predators, thieves, the climate). A kraal is a place for preserving food supplies, and an animal caretaker should ensure that animals are protected and do not escape. If the presentation is interpreted morphologically, it is possible that the objects represent a clock, indicating the time as 11:45. |
Table 3. (continued)

| Phase                  | Analytical focus | Operational questions                                                                 | Demonstration                                                                                                                                                                                                 |
|------------------------|-----------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 Interpreting the meaning | Summary         | What is the overall impression of the composition, the content, the order?              | The representation is coherently presented. The elements (man, animals and objects) are positioned in relation to one another with a specific function. The whole is well ordered and arranged on an underlying narrative grid: a story is told. The situation can be 'read' from all directions, from left to right, from the outside to the inside, from the man to the animals to the things. |
|                        | Performativa effects: What mood does the representation elicit? |                                                                                     | The mood elicited is ambiguity because the focus is on the (threatening stick of the) man, who is combining two roles (caretaker and gatekeeper), represented by the food in the trough and the stick. |
|                        | Understanding    | What sense do the analysed elements make?                                               | One cannot be sure about the meaning, but in the analysis three intertwined storylines have been identified.                                                                                                       |
|                        |                 |                                                                                     | - There is the circle, the food in the trough, and the high and closely spaced stakes: a closed world (with only a small gate)                                                                                     |
|                        |                 |                                                                                     | - An evident interpretative key seems to be freedom and captivity, escaping and staying inside, dangers outside and safety inside                                                                                    |
|                        |                 |                                                                                     | - Rather prominently, an interpretative key is the man (caretaker/gatekeeper/guard), his frightening stick, and his inhibiting attitude                                                                            |
|                        |                 | Which interpretation produces a coherent and rich account?                            | Overall interpretation #1: The representation tells a story: If you are the animal in this kraal, there is no easy way out. The man in the gate has to approve, he is the boss, he decides, and as long you eat his food (animal on the left, head down) there is nothing wrong, but as soon you threaten him (animal in the middle, head up) because you want out, he raises his big stick. This is the story of a young man longing to broaden his views (going out of the closed cycle in which he was raised and kept until now) but experiencing difficulties caused by an older man who is maintaining the traditional order. |
|                        |                 |                                                                                     | Overall interpretation #2: The picture shows a man who has the loyalty and courage to accept and to exercise his responsibilities, inherent to his position. He is the one who has to take care of the vulnerable livestock, who has to protect all living in his kraal and the existing order, and because those animals do not understand the dangers of the outside world and he cannot explain them, he has to block the exit and use a stick. The rebellious attitude of some of the animals he has to protect could be corrected with the herding stick. |
Table 3. (continued)

| Phase | Analytical focus | Operational questions | Demonstration |
|-------|------------------|-----------------------|---------------|
| Meaning | What are the storyline and general message of the representation—explicitly or tacitly? What view of reality is expressed—explicitly or implicitly? | The textual data refer to a physical location in Khuma (next to the police station) where there are traditional farms. But the young man elaborates: The time of those farmers is over (“no place [for]... past days”) and we are orientated towards modern times (“going to school”, “no longer focused on the agriculture things”). In the end he stresses a cultural issue: Not to forget one’s roots. | What is the meaning of the visual data in relation to the textual data? There are some differences between the visual and textual data. We mention the most important ones:  
- The textual data refer to a physical place with old-fashioned practices, while the visual data refer to a contextless, symbolically arranged place with a clash of desires.  
- The textual data stress a factual (completed) transition with a specific risk (“forgetting about our roots”), while the visual data sketch an ongoing, painful conflict in an intended transition.  
- The textual data relate to the outcome of the transition and the visual data relate to the process of the transition.  
- The textual data offer a rather harmonious picture, while the visual data stress the conflict and violence and are more gendered than the textual representation (a man is obstructing the exit).  
- The textual data express mainly the position and feelings of the ‘we’ (young persons), whereas the visual data are most expressive about the ‘they’ (older person with a stick). |
| Evaluation Interest | What is the significance of the interpretation in relation to the research question? | The visual representation raises a serious and complicated issue in intergenerational relations between young adults and older persons in this community: The tension between one’s roots and one’s loyalty, between (meaningful) others and (developing) self, between caring (home) and disciplining (guardians), between safety and openness, between the closed, agricultural world and the open world of school, the integrated world (of man, animals and things) and a fragmented modernity. Older persons are, in these tensions, primarily associated with a past (agni)culture, and with restrictive rules—not easy to escape from, but outdated. | Did the analysis take place without compromising the rigour of the procedure? The analysis has been completed without difficulties and the outcome is able to be considered grounded, validated, and reliable. |
For this purpose, the younger people were invited first, to express their experiences visually in relation to unrelated older persons through the Mmogo-method. On completion of this initial stage, the older persons switched positions with the younger people and reflected on what the younger people had said, while the latter assumed an active listening position relative to the older persons.

On the day of data collection, 10 young adult male participants (aged 20–25 years) and six people older than 60 years (one man and five women, aged 60–78) participated in the IGRT. The older persons were seated behind the younger people to assume an active listening position and to observe what the younger people had constructed. The younger people were invited to construct visual representations, using the unstructured materials, about their experiences in relation to older persons, in accordance with the four phases of the Mmogo-method. The analysis of the textual data is reported elsewhere (Roos, 2016b). The example of the second younger person (YP2) is used here to demonstrate the use of the proposed tool for analysing visual data. Table 2 presents the visual data to be analysed and the verbatim translation of the participant’s own explanation of the visual image Figure 2.

Discussion and Concluding Remarks

The need for an analytical tool that is atheoretical, accessible, user-friendly, practical, and designed for low-threshold analysis of image-created data informed the development of CIDA.

The application of CIDA, as demonstrated here, yielded different interpretations and micro-understandings of one case study. It serves as another approach to obtaining social meanings. In the example presented in this article, CIDA revealed the underlying generative mechanisms of intergenerational dynamics in a rural South African community. From the perspective of the younger person who created the image, older individuals act as the guardians of socio-cultural boundaries; they control intergenerational exchanges, and, when they perceive a symbolic threat, such as younger people who challenge socio-cultural practices (norms), the older individuals revert to threatening or restrictive behaviour. In combination with the textual data (see Roos, 2016b and Roos, 2016c for a comprehensive discussion of the findings obtained from the analysis of textual data), we think that interpretation #1 offered in Phase 4 is more completely grounded in our analysis, and better includes the contradictory perspectives of the representation, thus offering richer meaning. The request to construct visual data is about younger people in relation to older individuals and not from the perspective of older persons. Perspective #2 fits less well because this interpretation sets out from older persons as subject. On a formal level, the two interpretations have a core in common: for some reason (good and understandable or bad and obsolete) there are boundaries; they are contested and they are kept. There is no free exchange of domains (inside–outside) and it is an older man who controls this exchange with some force. The application of CIDA therefore confirms the textual data but from a different perspective.

The final integration of the independent visual and textual analyses produces an (ideographic) micro-understanding of each dataset. Integrating the micro-understandings at a higher level of interpretation thus produces transferrable knowledge; new information applicable to similar contexts or research participant groups (See Lincoln & Guba, 1985; Miles & Huberman, 1994.

The universality of CIDA as an analytical tool was demonstrated by its applicability for analysis of visual data created by participants from a rural South African community by inexperienced and experienced researchers across diverse socio-cultural backgrounds. This was possible because the analytical tool offered a conceptually sound and empirically grounded understanding (or explanation) of the image-based material as it relates to the research question. To this end, CIDA provides social science researchers, students, and evaluation boards with clear markers for conducting image-based data analysis that is not speculative but rigorous. The application of CIDA should clearly comply with widely acknowledged ethical research practices, including but not limited to protecting the identity of the producers of the visual data, and in the use or dissemination of knowledge obtained by the analysis.

Limitations of the CIDA analytical tool include that it is not framed for application in a participatory and interventional change model but is intended, rather, to serve the practical purpose of interrogating data in order to provide the basis for interpreting them from an atheoretical perspective to provide plausible explanations of social phenomena. However, by involving the producers of the image-based data in the analysis, social change can be created from an action research perspective (see Capous-Desyllas & Morgaine, 2018). Another limitation is that the tool has not been applied to static visual data, such as crockery or furniture or clothes, or to image-based data that depend on motion, such as videos, picture shows, movies or in-vivo presentations.

In the application of this analytical tool, we demonstrated that it provides a grounded, rigorous and transparent methodological procedure for analysing participant-created image-data. We are confident that the analytical tool is able to:

- be applied effectively to participant-generated visual data;
- be used easily by individual researchers or by a team of researchers;
- draw on several approaches during the process of analysis and therefore yields multiple perspectives and different conclusions about participants’ social meanings;
- be used for analysing image-based data as a separate unit of analysis, resulting in a collection of micro-understandings related to the social meanings that develop in relation to a complex social reality;
- provide a systematic procedure for analysing data irrespective of context or subject discipline; and
- offer an opportunity to scrutinise and verify the analysis, thereby contributing to trustworthiness.
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Notes

1. “Mmogo” means togetherness in Setswana, one of the 11 official languages of South Africa.
2. The Mmogo-method has been trademarked by the North-West University, South Africa.

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