Article

Scripting, Situating, and Supervising: The Role of Artefacts in Collaborative Practices

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Abstract: While calls for cross-sectoral collaboration have become a recurrent motif in sustainability-oriented policymaking and research, the practical realization of such processes presents significant challenges. The hope for "collaborative advantage" often gets traded for the experience of "collaborative impasse", namely those moments in which collaboration gets stuck. To better understand the reasons underlying such impasses, the study focuses on the impact of facilitation artefacts—objects designed and used in collaborative practices. The study proposes an analytical heuristic of collaborative practices to investigate the data collected in an explorative study, tracing artefacts across three different communicative modes of deliberation. Detailed analysis of the case, grounded in audio–visual material, semi-structured interviews, photo documentation, and participatory observation, shows that such artefacts substantially influence the structure of the emerging interaction order in a given setting, and that unscripted and unsituated artefacts might contribute to reinforcing those communicative patterns that collaboration aims to contrast. The study identifies three relevant practices in facilitation work, in order to steer emerging interaction orders away from exclusionary dynamics: scripting, situating, and supervising. Although emerging from the micro-analysis of artefacts, these practices might apply to other spheres of collaboration and serve as orientation for successful collaborative processes.

Keywords: artefacts; collaborative practice; facilitation work; collaborative advantage; collaborative impasse; frontstage and backstage

1. Introduction

Calls for cross-sectoral collaboration have become a recurrent motif of sustainability-oriented policymaking and research, as reflected in the discourses around co-design [1,2], co-creation [3,4], co-production [5], and collaborative governance [6–8]. Governments and scientific institutions initiate collaborative arrangements, hoping for these joint efforts to result in innovative and legitimate suggestions of how to face complex socio-ecological challenges [9,10]. However, collaborative processes do not always meet such expectations [11] of generating what Huxham defined as a "collaborative advantage", namely the achievement of results that none of the involved actors alone could otherwise have reached [12,13]. Instead, both research and practice reveal experiences of "collaborative impasse", namely those moments in which collaboration gets stuck [14]. These moments can derive from a multitude of reasons, often intertwined with each other and entangled in a bundle of diverse dynamics. Understanding these dynamics behind collaborative advantage and collaborative impasse is of both theoretical and practical importance, and can help to address the challenge of 'learning to collaborate while collaborating' [15–17].

An old idiom claims that the devil is in the details. In this paper, we turn this phrase into a research approach. In particular, we concentrate on the interaction between the social and the material

in collaborative practices, by looking at the design and use of facilitation artefacts [18–20]. In the words of Carlile et al., we ask 'in which ways objects, artifacts and materiality actually matter' in collaborative practices, as—based on our practice in transdisciplinary research, design, and facilitation of collaborative processes—we believe that they do [21] (p. 2).

A gap seems to exist between what practitioners and scholars in the field of collaboration consider relevant in the dynamics that influence the development and results of respective collaborative processes. Disciplines such as management and organization studies, or science and technology studies have opened up a substantial discussion about socio-materiality over the past decades. However, the academic literature on collaboration has instead dedicated extensive attention to different communicative methods, and has not extensively analyzed the role of artefacts in this context [22–26]. Some important exceptions, which will be discussed below, do not fully compensate for the tendency to either take material objects for granted or else deem them insufficiently relevant to consider in the analysis [27–30].

In practice, on the other hand, facilitation artefacts receive much attention. For example, organizational consultant Harrison Owen realized that some of the most fruitful and living conversations were taking place during the coffee breaks of the conferences he convened [31]. Fascinated by this discovery, he designed a collaborative format called Open Space, with an ongoing buffet at its core. Facilitators trained in this method are acutely aware of how a well-formed circle of chairs with some flowers in the middle, and well-written flip charts, are crucial for the success of the event. The strategic organization of material objects is considered a key aspect to enable self-organization of participants. The "design thinking" method, well known in the social entrepreneurship scene, foresees a very specific setup to support its participants in coming up with innovative ideas: standing-height tables in order to integrate body and mind in the thinking process, pinwalls with easy-roll lockable casters to ensure flexibility in the contents produced, and a rigorous presence of different sized and colored adhesive "Post-it" notes to generate as many ideas as possible [32]. Practitioners, therefore, seem highly aware of the importance of this material component of collaboration in their daily work [33].

Not everyone might share this passion for detail while designing a collaborative process. However, processes do not remain unaffected by the very materiality of artefacts and setting, especially when deciding to take responsibility for bringing various actors together, e.g., in the context of a transdisciplinary project or science-policy interface. While observing and being involved in numerous collaborative processes, we have been struck by the following puzzle [34] (p. 27 cf): facilitators of such processes pay great attention to the material side of collaboration; much more than researchers in this field do. Following this initial interest, we ask the overarching question: *How do artefacts contribute to collaborative processes, in particular to their success or failure?*

In order to address this research question, we first present an analytical heuristic of collaborative practice in its spatial, temporal, and socio-material dimensions that supports our data analysis. This heuristic builds on the existing research on facilitation work and socio-materiality. Secondly, we introduce the methods we used to collect data, and subsequently analyze our case study: a three-day explorative study of how different communicative methods may enable active contribution by citizens engaged in collaborative policy making. Following our heuristic, we present and discuss the results and formulate four arguments on the role of artefacts in collaboration.

The theoretical contribution of the article to the current literature on collaboration unfolds along different strands: (1) it brings the materiality of collaboration to the forefront of analysis and shows its interrelatedness and contribution to the potential success or failure of collaborative arrangements; (2) it offers a critical and in-depth analysis of how the micro-politics of collaboration substantially impact the overall results and indicate a path for future improvements; (3) it bridges scientific and practical knowledge in the field, by drawing on practitioners' "embodied knowledge" [35] on the one hand, and on the other making evident the mechanisms and practices related to facilitation artefacts that might be overlooked in practitioners' everyday work; (4) the paper's proposal of a heuristic of collaborative practices offers researchers an orientation to investigate the multitude of dynamics—spatial, temporal, and material—that shape the development of a collaborative exercise.

1.1. A Heuristic of Collaborative Practices

> *'Facilitation is political work: you are creating an artificial situation, orchestrating materials and artefacts, and seeking to enable dynamics that would not happen otherwise.'* (Escobar et al. 2014, p. 96 [36])

In order to investigate collaboration at a micro-level, the following section develops a heuristic of collaborative practices, building on the work of Hajer [27] and Escobar [28,37,38]. We first identify relevant concepts from the literature on collaboration to describe the work of collaboration-oriented practitioners at a micro-level in their spatial and temporal dimension along four phases: *scripting*, *setting the stage*, *performing*, and *inscribing*. Secondly, we discuss relevant literature from management and organization studies, as well as science and technology, in order to investigate the role of artefacts within these collaborative settings in their *scripted, situated*, and *relational* nature. In this way, the intention is to combine a selected state-of-the-art review with the development of the analytical heuristic that guides our investigation.

1.1.1. Spatial and Temporal Dimensions

At a micro-level, collaborative practices can be interpreted as the attempts of process designers and facilitators to assemble and shape new "interaction orders" in the communicative and material dynamics that unfold in a collaborative setting [37] (based on the work of [39]). By challenging communicative patterns that lead to exclusionary dynamics, these interaction orders attempt to foster inclusive, meaningful, and productive conversations [40].

Facilitators and process designers, namely the main "makers" behind institutionally led collaborative processes, are investigated separately in this study, although these roles may often be played by the same actors. Moore describes facilitators as 'those who lead discussions and continuously interact with the other participants in the conduct of the discourse' [41] (p. 147). This definition focuses on the work of these practitioners in what, in Goffmanian terms, would be called the "frontstage" [42]. However, as Escobar underlines, collaborative practices and facilitators' work are not limited to the frontstage, but also require extensive "backstage work" [37]. In their backstage work, process designers 'define, through multiple and fine-grained design choices, the rationale, framing, and rules operating in the collaborative space' [14]. Process designers might also involve a broader group of actors beyond the facilitators, such as the conveners of the arrangement, other policy makers involved in the issue, experts, representatives of the participant groups, and other stakeholders. They all, to differing degrees, contribute to shaping decisions on what the frontstage of collaboration will look like. The concept of frontstage and backstage [42] is useful at an analytical level, since it applies a spatial dimension to identifying "what happens where" in a collaborative practice, and can precisely locate the social interactions occurring within it.

Interaction orders designed by facilitators and process designers, whose intention is to support inclusive, collaborative, and productive dynamics among participants, should not be understood as something static. Instead, they interweave with—as we term them—"emerging interaction orders" generated when new actors, such as participants or other stakeholders, enter the collaborative arena [43] (based on the work of [44]). In order to track and investigate this interweaving process [44] through time and space, we propose a heuristic of collaborative practices. We draw our heuristic from the work of Hajer, who identifies four key concepts that contribute to illustrating the performative dimension, mostly frontstage, of collaborative policy making ("scripting", "staging", "setting", and "performance") [27] (p. 631), and Escobar, who extends Hajer's concept of scripting to the backstage work [28] (p. 274) and identifies other crucial dimensions of facilitation work [38]. Building on their concepts, we identify and illustrate four phases of collaborative practices: *scripting, setting the stage* [This phase draws from the "setting" concept illustrated by Hajer, defined as 'the physical situation in which the interaction takes place and can include the artifacts that are brought to the situation' [27] (p. 631). However, the "setting the stage" phase in our heuristic explicitly includes in its analysis

the previous dynamics occurring backstage among facilitators, process designers, and other actors, which will result in Hajer's frontstage "setting". It is worth mentioning that Hajer uses the expression "setting the stage" in the title of the same article, though without defining its meaning], *performing*, and *inscribing*. In reality, these should not be strictly intended as sequential phases, but as dimensions interweaved with each other and progressing iteratively, back and forth.

Scripting—The scripting phase, happening backstage and in closed-door settings, represents the core of assembling new interaction orders. The script of the collaboration begins taking form with the identification of a potential collaborative advantage in addressing a specific problem [45] (p. xxi). Once the leading question of the issue to be tackled is shaped, process designers begin to form an agenda and identify communicative methods, thematic inputs, and facilitation material in order to enable the group of participants to engage in productive discussion. Such work is similar to generating choreographies. However, the focus is not on performers executing exactly what is written in the script, but in prefiguring the paths that participants could potentially walk, without establishing their results [28] (p. 273) (based on the work of [18]).

Setting the stage—Immediately before the collaborative event starts, still in the backstage, facilitators and process designers 'populate the room with artefacts that seek to compel participants to act and speak within certain parameters' [28] (p. 276). They choose a specific seating arrangement; carefully write flipcharts, with questions to address, but also instructions on how to reach the restrooms, in order to silently share with participants all relevant information they may need to work productively and at ease; check the microphones; decide who is going to sit where; agree on time breaks with the catering service; and review the agreed script before the performance begins.

Performing—The encounter between process designers, facilitators, participants, and artefacts in the frontstage is a relational and situated performance [43] (p. 476). In this setting, facilitators rely on their scripts but are often required to perform "impromptu scripting," the practice of reacting to participants' deviations from or resistances to the original scripts (what we call emerging interaction orders) with new propositions [28] (p. 279). Moore defined the work of facilitators in this context as 'following from the front' [41]. Participants in collaborative settings are not passive consumers of the initially designed interaction order, but rather 'appropriate, resist and transform' it [46] (p. 219).

Inscribing—In-between frontstage and backstage, the dimension of inscribing consists of the attempt to condense 'multiple knowledges, utterances, documents . . . into workable translations' [38]. Still in the performing phase, ongoing documentation of the results takes place via multiple devices (flipcharts, Post-it notes, templates) and hands (facilitators, graphic recorders, volunteering participants), with the intention of offering visual anchors and orientation in the multitude of words spoken in the room to the public. Inscribing plays a crucial role for the backstage work that usually follows the collaborative event. In the latter, a refined translation of the discussed contents is necessary in order to share them with actors responding politically to the deliberation [47].

1.1.2. Socio-Material Dimension

> 'Social life transpires through human activity and is caught up in orders of people, artifacts, organisms, and things [. . .] and it exists only as so entangled.' (Schatzki 2002, p. 123 [18])

Next to the spatial and temporal dimension, collaborative practices are shaped by a socio-material one. Within our heuristic, we analyze the role of facilitation artefacts as *scripted, situated,* and *relational*. While many scholars still tend to treat material and human agency as separated in their analysis, as Jarzabkowski and Pinch note [20] (p. 581), the present paper investigates how material artefacts play a role in social interaction by focusing on the entanglement of the social and the material in collaboration. In the context of our study, we understand the material world in collaboration as being designed and mobilized by process designers to support the performance of the arrangement [19] (p. 1865). Further, the arrangement's outcomes are defined by the constant interaction between materials and "performers" (participants, facilitators, other actors). In this way, facilitation artefacts are not meaningful as such, but are so only in the embedded context of social activities [29] (p. 612), [20] (p. 586).

Artefacts are scripted, situated, and relational [48–51]. They are *scripted* because they are assigned specific purposes by process designers and facilitators. This potentially defines their function in a certain setting. More generally, studies on artefacts in collaboration identify functions such as motivating collaboration, creating common understanding, and objectifying people's thinking [29] (p. 612), [30] (p. 535). Scripted facilitation artefacts are used as means of shaping and negotiating the social space that will host the participants [52]. In this way, artefacts contribute to form new "social worlds," namely, 'groups with shared commitments to certain activities, sharing resources of many kinds to achieve their goals and building shared ideologies about how to go about their business' [53] (based on the work of [54–57]).

Artefacts are further *situated*, or physically and communicatively embedded, within the collaborative practice [58] (quoted in [50]). Each facilitation artefact is embedded in the larger framework of a designed interaction order, assigned a certain function at a specific time in a specific setting, and connected to other objects and activities. In our understanding, "situating" is a crucial activity of facilitators and process designers along all temporal phases of the arrangement. If situated "wrongly", an artefact's scripted function can fail. Introducing a flipchart of the agenda two hours after the beginning of the collaborative process, for instance, can hardly serve its initially scripted purpose.

The third fundamental dimension of artefacts is their *relational* nature. This has been aptly summarized by Star [51] (p. 603): 'An object is something people […] act toward and with.' It is not sufficient to place an object in the room to achieve the scripted purpose. The object "lives" in terms of enabling, shaping, but also constraining, once social interaction starts. It is in this relational dimension that we can observe the chains of action that result from the unfolding encounter between social and material worlds [18]. Artefacts are starting points of a process of meaning negotiation between participants and facilitators, and among participants themselves, and can be assigned functions beyond those originally designed. 'Documents quickly pass beyond the reach and protection of their maker and have to fend for themselves,' state Brown and Duguid [52]. This fluidity characteristic of artefacts can lead to creativity (e.g., participants cutting the instruction sheet into a quick prototype to plastically show others their new idea), but also deviation from an event's purpose (e.g., participants using a documentation template to stabilize a wobbly table). The art of forging facilitation artefacts, therefore, implies a combination of clear instructions and enough open space for participants' interpretation and creativity.

Scripting, however, as every human practice, does not generate "indestructible" processes: it can contain gaps and omissions. Unscripted artefacts, namely inappropriately designed objects or facilitation materials, may be used by facilitators due to their routines and without specific purpose. Such unscripted artefacts can resemble an instrument whose melody does not match the general score, and can easily "talk back", namely resist what participants are being assigned to do with them [59] (p. 31). Artefacts thereby reveal their affordances and constrains in relation to a specific situation [20,60,61]. For instance, seating arrangements considerably influence group participation and decision-making: following a plenary session with participants sitting in rows, if the facilitator invites their public to briefly discuss their main insights in small groups, then the use of interlinked conference chairs—which until then afforded the properties requested for the plenary session—will "talk back" and reveal their constrains to participants, who will realize an impediment to easily reorganize into sub-groups [62,63].

2. Methods

In order to address the research question mentioned above, we applied an abductive reasoning perspective [34,64,65], along with the grounded theory approach [66–68]. This choice made it possible to move 'back and forth between our own data, our experience, and broader concepts' [69]. Different from original grounded theory accounts, we did not stick to a theoretical tabula rasa but came up with a literature-induced heuristic of collaboration. This allowed for purposeful organization of the rich data without compromising the explorative character of the study. The types of phenomena we were interested in required some openness with regard to research design. Although qualitative researchers

usually 'study things in their natural settings,' we decided to combine exploratory and observational approaches [70–73]. In particular, we applied the analytical methods of grounded theory to datasets collected via the exploratory case study.

2.1. The Case

The exploratory study was designed to investigate collaborative practices in the field of mobility transition in cities. The case took place on 20–22 June 2019 in Magdeburg, Germany, and was set up by a research team from the Institute of Advanced Sustainability Studies (IASS, Potsdam) in cooperation with the German TV channel MDR (Mitteldeutscher Rundfunk) and the City of Magdeburg.

Each day, a different group consisting of 5–7 local citizens (17 in total) was asked to generate ideas related to the same policy-relevant question: '*How can Magdeburg's inner city become more attractive to pedestrians?*' With this question, the City of Magdeburg intended to gain insights from its citizenry on the inner city status quo and on potential ideas for more pedestrian-friendly strategies. The timeframe for each slot was three hours. The researchers selected three different interaction orders for comparison: self-organized collaborative work on day 1, dynamic facilitation method with a facilitator on day 2, and tailor-made multi-method process design with a facilitator on day 3. A total of 702 potential participants were randomly selected from the official register of Magdeburg residents, and a postal invitation to participate in the study was sent to each person's registered address. This initial invited group comprised an equal number of women and men, distributed equally among three age groups (16–34, 35–54, and 55–74 years). However, the positive response rate was initially only around 1% (n = 7). Following post-recruitment phone calls to 84 of the 702 citizens [Researchers did not have direct access to residents' phone numbers. Therefore, they identified publicly available phone numbers for 84 of the original 702 invitees. Of those 84: 27 were aged 35–54 (12 f, 15 m) and 57 were aged 54–75 (21 f, 36 m). Six of these 84 individuals participated in the event. The youngest age group (aged 16–34) could not be contacted at all via this chosen post-recruitment method, as this age group mostly uses mobile phone numbers that are not publicly registered], complemented by "street intercept" recruiting [74] in inner city Magdeburg [In the "street intercept" recruitment method, researchers addressed pedestrians—always the seventh one after the previous one—on a previously determined route in inner city Magdeburg and invited them to join the event. The recruitment process lasted seven hours and a researcher spoke to 65 citizens, of whom five accepted immediately and a further eleven shared their phone contacts to enable follow-up by the researchers. Of these sixteen individuals, four subsequently participated in the event], the response rate was increased to 2.42% (n = 17: 10 women, 7 men). However, due to this low response rate, the selection strategy's original goal of recruiting a sufficiently diverse sample was only partially met. Furthermore, despite the initial intention of running two groups for each format, the number of participants only enabled one format to be held per day. The exploratory design envisaged that each of the groups would work in the same room in Magdeburg City Hall, could use the same facilitation artefacts for the collection of results, and would have the same amount of time available.

Each of the collaboration partners had different interests in and expectations of the event. MDR, which first contacted the researchers, was looking for interesting cases for a TV documentary on the role of citizens in democratic innovations. Such innovations depart from the 'traditional institutional architecture' of democracies [25] (pp. 1–2), and are designed to increase citizens' 'opportunities for participation, deliberation and influence' [75] (p. 11). However, these very opportunities are reported to depend on the actual type of innovation and the way it is designed [76]. The IASS research team was thus interested in exploring the influence of different interaction orders (reflecting possible types of democratic innovation designs) on the quality and outcomes of collaborative work. The cooperation with MDR, and their financial engagement, enabled the organization of the study and guaranteed access to a very dense audio–visual documentation of the three formats. For this exploration, it was imperative for researchers to observe a real-world collaborative process, not a simulation. In order to achieve this, the City of Magdeburg was invited to join the partnership and asked to identify a

policy-related issue on which the input and engagement of its citizens were considered necessary. Officials from the city development department co-developed with the researchers the leading question of all three formats, hosted the event in rooms at the City Hall, and showed interest in including the citizens' ideas in their work toward a new concept for the inner city.

Two members of the research team actively designed the exploratory study and selected three different kinds of interaction orders, developed and implemented the recruitment process, and managed the communication with all partners, while the two authors of this paper undertook exploratory accompanying research [77].

2.2. Data Collection and Analysis

Empirical data collected and processed to inform our analysis included:

- Field notes from participatory observation of both the backstage and the frontstage work of the collaborative process throughout the phases of scripting, staging, performing, and inscribing.
- Thirteen recorded and transcribed semi-structured interviews with actors engaged in the process. Facilitators and researchers were interviewed before and after the event. Due to time constraints, officials of the city development department were interviewed before the event, and participants and the MDR director afterwards.
- Seven hours of audio–visual recordings of all three events; transcripts thereof, including coded segments of each participant's speech time.
- Pictures of the resulting documentation (maps, Post-its, and templates) filled in by the participants during each event.

Having a chance to investigate in detail the three different approaches to facilitation artefacts, we decided to follow a 'method for moving back and forth between data analysis, interpretation and the process of explanation or theory construction' [69] (p. 180).

In the first stage of the analysis we reviewed and explored our field notes and semi-structured interviews in order to identify references made regarding the object of the initial research puzzle, that is, artefacts. After the first iteration of open coding, codes were organized along the spatial-temporal dimension of the collaborative heuristic and assigned to the phases of scripting, setting the stage, performing, and inscribing. This allowed for identifying in particular those artefacts that had been used in all phases. In a further iteration, axial coding allowed for supplementing the analysis with the socio-material dimension (scripted, situated, and relational artefacts) and establishing linkages between its categories. Focusing on the artefacts established as most relevant in the previous step, we traced how they were perceived by different participants and how they unfolded along the phases and varied in their (scripted) function, use, and interpretation across the three formats that we analyzed.

In the second stage of analysis, we turned to the audio–visual material in order to further substantiate the emerging patterns with respect to the socio-materiality of artefacts. As the video material was generated by four fixed and two moving cameras in the room, the analysis allowed for gaining multiple perspectives on each scene. Here, verbal accounts of artefacts could be supplemented by observation of participants' actual behavior, the use of artefacts, and interactions they induced/were present in. In a further step, we decided once again to zoom in [78] on specific video sequences that captured the relational dimension of artefacts, as well as their entanglement with the social world, and coded them accordingly. While organizing data into categories and identifying patterns, we paid special attention to the 'interaction between variables' [71] (p. 118) and undertook constant comparison among the three analyzed formats.

3. Results

The core of the presented case study consisted of investigating how three different interaction orders could foster collaborative work around and offer potential solutions to the same overarching question: *'How can Magdeburg's inner city become more attractive to pedestrians?'* Originally, the research

design did not explicitly intend to investigate the role of facilitation artefacts, and focused instead on communicative interactions. More precisely, the researchers planned to use the same kind of facilitation artefacts for the collection of results (which they called "results' containers") for all groups, in order to generate a constant variable among them. These "results' containers" had been designed together with the facilitator of day 3 during the scripting phase. The use of the same artefacts in all groups aimed to compare, at a later stage, the results produced by participants and, on a policy-advice level, to offer a "homogenized" overview to the city development department of the City of Magdeburg.

> *'We will work with different results' containers, identically for all three groups. In particular, we thought about a map to which specific ideas could be pinned. Another template will allow participants to separately record concrete and further developed ideas. I think this format is applicable to the work of the city administration.'* (Researcher)

The results of our analysis show that the choice of implementing a specific (communicative) interaction order has a significant impact on the ways in which social and material worlds interweave with each other. In particular, via abductive grounded theorizing, we formulate the following arguments:

(1) The presence or absence of artefacts in the room has a substantial influence on the structure of the emerging interaction order;

(2) The very same artefacts are interpreted and used differently within different emerging interaction orders;

(3) Unscripted and unsituated artefacts might contribute to reinforcing those communicative patterns that collaborative interaction orders aim to overcome;

(4) Purposefully scripted and situated artefacts also require constant supervision by the facilitator, in order to embed them in their emerging interaction order.

In order to elaborate on these arguments and their empirical foundation, we first reconstruct the interaction between the social and material world in each of the three days; secondly, we introduce the backstage work in the *scripting* and *setting the stage* phases that brought the respective facilitation artefacts ("results' containers") to the hands of participants; thirdly, we zoom [78] in on some vignettes of the frontstage work in the *performing* phase relating to our four arguments; and finally, we discuss the results of these collaborative practices in the *inscribing* phase.

3.1. Interactions between the Social and Material World: Three Constellations

Day 1: Interaction between facilitation artefacts (not chosen by participants) and participants—On the first day, five participants discussed ideas in a self-organized way (see Figure 1). Without external moderation or preassigned roles in the group, participants were invited by researchers to discuss the main question with the support of the "results' containers": a map, Post-its with five predefined categories, a template to document their ideas, and marker-pens. With this kind of setting, researchers originally intended to emulate a quite common scenario of self-organized citizens gathering to discuss a certain issue, in order to investigate the unfolding communicative dynamics.

Day 2: Interaction between facilitation artefacts (not scripted by the facilitator), facilitator, and participants—On the second day, a professional facilitator was invited to support the dialogue among five participants via the method of dynamic facilitation [79,80] (see Figure 2). The facilitator did not take part in the scripting phase. Instead, she was asked to plan an agenda according to this facilitation method and to use, next to the facilitation artefacts specific to this method (four flipcharts documenting the discussion, headed: Ideas/solutions; Concerns; Facts; Questions/challenges), the same facilitation artefacts as foreseen for all groups. This setting intended to emulate a "one-method-fits-all" logic: finding a facilitation method that can be implemented in any context and that does not require an extensive scripting phase.

Figure 1. Participants of the self-organized group discuss their ideas with the support of a map.

Figure 2. One participant explains her ideas to the facilitator during the dynamic facilitation session.

Day 3: Interaction between facilitation artefacts (scripted by the facilitator), facilitator, and participants—On the third day, a professional facilitator guided a group of seven participants along a process design that she scripted (including the "results' containers") for this specific context, together with the researchers (see Figure 3). This kind of setting was expected to verify the working hypothesis of the researchers: that a collaborative arrangement, in order to produce sustainable and inclusive results, needs to be collaboratively and extensively planned in all its dimensions (e.g., communicative methods, facilitation artefacts).

Figure 3. Participants of the tailor-made collaborative process document their ideas on a map.

3.2. Backstage Work

3.2.1. Scripting

In order to script the third format, researchers and the facilitator of day 3 meet [The following Sections 3.2 and 3.3 intentionally use the present tense, in order to illustrate an "in-the-moment" analysis [28] of the events] several times to define the purpose, the leading question, and to generate an interaction order '*fostering co-creation*,' as a researcher frames the goal of this collaborative exercise in an interview. During one of these meetings, the discussion is centered on what kind of facilitation artefacts could be used to support participants in generating and documenting results. Ideas thrown around include pictures from the city's past and images of good practices from other cities. In general, the material to be used is associated with knowledge that process designers want to provide to participants as an "entry point". After a collective brainstorming session, the researchers and facilitator identify five categories to guide participants in developing their ideas: redesign of streets; nature; art/culture; leisure areas; and stores/businesses. One extra category is left open, in order to integrate new ideas that process designers might not have considered.

> '*I believe that, within such a short time, it is useful [. . .] to define what is the scope of action for participants to develop their own ideas. We are suggesting these categories rather as a projection surface. These may match, or not, and [participants] might also realize that there are completely different categories. This [suggesting categories] accelerates the process.*' (Facilitator)

The intention of the facilitator immediately translates into the development of concrete artefacts, as illustrated in Figure 4. A map of inner city Magdeburg is created, onto which participants can pin their ideas written on colorful stickers (six colors, one per category). Moreover, an A3 (paper size) template is designed for participants to note down the details of their ideas, with some guiding questions to allow precision. The scripted function of these artefacts is to offer participants some orientation points, a potential focus for the limited time available, and guided support for documenting their ideas. The sixth sticker, lacking a category, is intended to encourage disagreement and creative thinking among the group. In this way the process designers purposefully prefigure the path [28] (p. 273) (based on the work of [18]) leading participants to document their ideas and, at the same time, leave some options open for participants to diverge from the main path and define their own way to reach the goal.

(**a**)　　　　　　　　　　　　　　　　　　　　　　　　　(**b**)
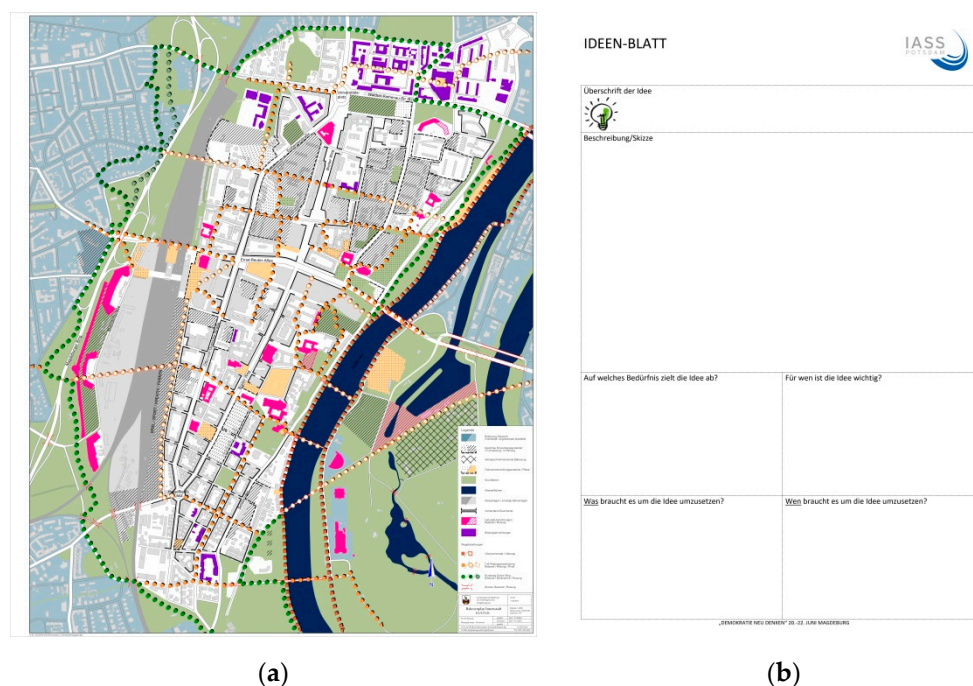
Figure 4. The "results' containers": a map (**a**) and a template (**b**), made available to all three groups in order to document the results of their discussion.

3.2.2. Setting the Stage

While the scripting phase is characterized by communicative negotiations, deliberation in this phase takes place in a physical room, which is at the same time also the object of discussion. Contentious points are mostly the inclusion, absence, or positioning of objects. The phase of setting the stage opens up the exercise to a larger constellation of actors. Each—equipped with different resources, competences, and stakes in the process—can influence the way the stage is being set: in our case, researchers, camera operators, and facilitators. They all shape or, as stated in several interviewees' words, negotiate on and make compromises regarding the setting. One facilitator reflects: '*in a way, I intentionally accepted working in a context and setting which was not optimal for the method*.' On day 1, the camera team arrives first on the location. They choose the smallest room available in the municipality building to host the event, '*because there was an overhead light hanging [from the ceiling], where they could attach their spotlights*', assumed one researcher in an interview. The room is dark and warm on this summer day: large, black curtains are hung in front of each window '*to keep the daylight outside,*' states the documentary's director. The researchers realize that this may impact the performance, productivity, and creativity of participants. However, when they arrive, there is too little time left to re-discuss how and where to set the stage. They realize a further limitation caused by the camera crew: participants cannot move freely due to their microphone cables.

Two researchers (one a co-author of the present article) go to the room hosting the collaborative exercise. They quickly discuss where to place the facilitation material, which has changed slightly from that discussed in the scripting phase. The researchers charged with purchasing stickers to pin on the map, having a vague memory of what has been discussed previously on their exact use, have instead bought 20 × 15 cm Post-its in four different colors. Knowing the limitations caused by the discussants' microphones, which hinder participants in moving from their chairs, they decide to place Post-its on the table where the map is located, together with some copies of the template and some thick flipchart marker-pens, which is what they found available on the spot.

On day 3, as soon as the facilitator who participated in the scripting phase arrives on the spot and sees the facilitation material, she observes that the Post-its bought by the researchers are too big for the purposes of the exercise. By this time, the groups from days 1 and 2 have already worked with

these larger Post-it notes. She takes scissors and starts cutting each into five parts, reducing their size. She also turns around the pinwalls so that the maps are not visible, since participants will work on these only during the second phase of the process and are not expected to see them at the beginning of the process. The facilitator thereby purposefully situates, physically and temporally, the facilitation artefacts in the room and reconnects them (e.g., by cutting the Post-its) to the original intention of the script.

3.3. Frontstage Work

3.3.1. Performing

The performing phase witnesses a constant interplay between the designed interaction order, which the process designers previously scripted in order to generate a productive exchange, and participants, who constantly interact with, negotiate, and sometimes resist the offers of facilitators [46]. Facilitation artefacts represent the tangible materiality of this offer. While researchers and facilitators may have scripted these artefacts' use and situated them in the room with a specific intention, the results show that their effect on the three performances varies significantly. We show this along the previously mentioned four arguments and by zooming in on several vignettes of the performance [78]:

1. The presence or absence of artefacts in the room has a substantial influence on the structure of the emerging interaction order—Facilitation artefacts, their presence or absence, turn out to have an indirect influence on the way participants interact with each other and structure their conversations. At the beginning of day 1, a male participant looks at the pinwall that illustrates the five predefined categories (redesign of streets; nature; art/culture; leisure areas; and stores/businesses) and suggests starting with the "streets" category. He distributes Post-its, which he finds on the table, to each participant, so that they write up their ideas. The Post-its and the predefined categories are used by participants to start, structure, and manage a conversation among strangers situated in a room for the next three hours with cameras filming them. This procedure soon becomes an emerging interaction order. However, participants soon abandon the Post-its: *'I believe, the lady next to me and I were the only ones who actually wrote things down, the others [all men] did not want to write at all. And then we gave up pretty quickly and directly wrote everything onto these big sheets of paper [the template]. We haven't really paid attention to the small cards [Post-its] anymore. But it was just because the small cards were lying there [on the table], that we originally took them.'* (Participant, day 1). In this statement, the interviewee reflects on how the participants' initial decision to write on Post-it notes was simply due to their presence on the table. However, it also shows that the interaction order "imposed" by the Post-its is quickly resisted by some members of the group. The video recording shows, for instance, how a participant immediately starts commenting on one of the categories without writing anything on the Post-it, and how others follow him by sharing their opinions. He thus ignores the artefact. At a certain point, participants decide that, alternatively, one person should protocol the ideas, using the template. They even discuss this decision openly and humorously (*'do not want to write'* and *'it's too hot in here...'*). A collective decision by individuals against a certain artefact (*'let us write collectively!'*) becomes a moment of unity in the group.

Similarly, the absence of artefacts also has an effect on the way participants are enabled to generate ideas. On day 2, no tables are included in the setting: the room is small and priority is given to the initial row of chairs and the four flipcharts required by the dynamic facilitation method. In the last part of the session, participants are divided between two groups and invited to further elaborate and document the ideas emerged in their discussion. One group struggles to write on the Post-its, as one participant reports in an interview: *'these strange sticking Post-its, I found them quite awkward in that moment, because you had these floppy sheets of paper in your hands and didn't really know how to write on them.'* Due to the difficulty of simultaneously holding the Post-its and writing, the two women decide to share tasks: *'one held them [Post-its] and the other one wrote on them ... [...] there should have been some other working material, something else, maybe some kind of support or so, you know? Not just a piece of paper in your hand; that was silly.'* The lack of a physical support for writing has consequences for the

productivity of the discussion: participants first have to come up with an alternative solution to note down their results. This undermines the function of the Post-its, which are consequently described as inappropriate for participants' purposes.

On day 3, one of the participants, a non-native speaker of German, seems to have difficulties in sharing his ideas (he only speaks 1.5% of the time during group work). However, the map is a helpful device for him. At a certain point of the discussion, he stands up and looks at it. His pointing at the map, even without saying much, allows him to momentarily become an active part of the emerging interaction order of the group. He makes eye contact with other participants, and points at elements on the map where he may have a question or would like to make an observation. Another woman stands up next to him to hear him better. The map thus has an enabling effect. Star called these artefacts "boundary objects", namely an object that 'sits in the middle' [81] (p. 47), 'a sort of arrangement that allows different groups to work together without consensus. [. . .] a shared space' [51] (pp. 602–603). The presence of the map supports communicative interaction between participants. A participant simply needs to point to the map, and the attention of the other members of the group is immediately drawn to it. It fosters concreteness, precision, and mutual understanding, since it allows participants to show the others what they are talking about.

2. The very same artefacts are interpreted and used differently within different emerging interaction orders—When researchers decided to use the same "results' containers" in all three groups, they intended to make the same material resources available to everyone and provide equal support in generating ideas. However, the empirical material shows that the same facilitation artefacts are in fact open to different interpretations and uses.

On day 1, the five categories and the Post-its seem to structure the flow of the conversation. However, they do so in a different way than was originally scripted by the process designers. In this case, the diligent way of following the proposed categories may foster productivity at the cost of creativity. Statements such as *'we ticked off a lot of squares!'*, or *'we were productive!'* from an interview with a participant show that the group measures success mainly by the quantity of written Post-its and templates produced. Indeed, an analysis of the three groups' documentation shows that the self-organized one produced a much higher quantity of suggestions than the other two. Enthusiastic announcements in the group such as *'another note has been produced!'* or *'we need to fill up this sheet'* confirm this attitude towards the task to fulfill during the three hours. After one hour, when the conversation falters and the group does not know exactly what to write, one participant states ironically: *'I think they have cancelled the show already'* and laughs. The presence of cameras, in terms of artefacts, nurtures this dynamic. Although in conversation with each other, participants seem to be very aware of the fact that they are being filmed and should "perform well"—as measured by writing ideas on the given artefacts.

Next to the different interpretations of the "results' containers," we also observe different uses of these artefacts on the three days. On day 1, one of the reasons for abandoning the use of Post-its is that only thick marker-pens are available for writing on them: *'these notes [Post-its] that you [researchers] distributed had kind of a workshop touch, where you write a word on it and stick it to a wall somewhere, right? And we were supposed to develop many ideas, but then the marker-pens were too thick to write all ideas onto these small Post-its. [. . .] with these marker-pens, we were a bit limited.'* In this context, Post-its are, in Schön's words, "talking back" to participants and revealing the constraints that they impose [59]. In their physicality—their size (too small), combined with the size of the marker-pens (too thick)—both artefacts hinder the participants' intentions, namely, to write whole sentences on the notes. This differs from the other two days, when both groups use the same materials without complaining or asking the facilitator for thinner pens. A working hypothesis attributes this to the timing with which the artefacts are situated in the agenda. On days 2 and 3, the artefacts are not used for an initial brainstorming session as the group in the first format did. Instead, they are used in a way that is closer to their scripted function, namely at the end of the session to sum up and present the ideas that have been extensively discussed during the first two hours. At this stage, single keywords written on the Post-its

are enough for other participants to understand the meaning behind them. Timing therefore plays a crucial role in using artefacts in a way that stays close to their scripted intention.

3. Unscripted and unsituated artefacts might contribute to reinforcing those communicative patterns that collaborative interaction orders aim to overcome—Asked about her assumptions regarding potential dynamics emerging in the self-organized group, one of the facilitators answered: '*I could assume that the patterns which everybody has in her everyday life will emerge [in this setting], so that the [. . .] eldest children, in psychotherapeutic terms, will take the lead, that everyone [. . .] falls back into their own pattern, [. . .] And then, I think, based on how many men and how many women are present, one could also recognize specific patterns.*'

This hypothesis is confirmed, and not only in the self-organized group. Two examples show how the relational nature of artefacts [51] can reinforce communicative patterns such as exclusionary dynamics or tendencies to reproduce social structures that collaborative practices aim to challenge [82–85]. On day 1, the group decides at a certain point to abandon Post-its and start writing collectively on the template. The man who moderated the discussion at the beginning of the session assigns the role of documenting the discussion to a woman. He does it while offering her a template to fill in and affirming that '*women tend to have the best handwriting.*' His statement is supported by the other two male participants. Time to speak is considered as a resource in this setting, so whoever is not documenting has more chances to speak freely. A coding of the spoken segments of each participant shows that this man spoke 31.4% of the time during the three hours. The woman tries to pass the template to the other woman sitting next to her (another woman, following the same line of thinking as the man), who instead refuses non-verbally and pushes the template back. The template thus becomes a medium to assign specific roles to participants, and is used in a way that forces the interlocutor to either accept or make an effort to refuse. '*She was actually forced to do it. Nobody wanted to, and then she had to, more or less,*' as another participant comments in an interview. Having accepted the first option, the woman looks for another pen, since the marker-pens available are too thick to write on the document. After realizing that there is no other pen available on the table, she takes one out of her bag, commenting '*Oh, women and handbags . . . *' Having found the pen, she asks for some input on what to write, and the man who gave her the template starts dictating her some ideas. While this may be done with the best intentions, the act of dictating has a relevant impact on the way the ideas are being framed and will be subsequently translated into results. This segment shows how unscripted and unsituated artefacts can reinforce asymmetries (in this case regarding gender) and hierarchies (who is in charge of dictating) within the group. In this case, even the woman contributes to this, maybe ironically, by engaging with other artefacts (firstly finding a pen, and secondly highlighting how carrying bags has its advantages for women). In this case, the artefacts (Post-its, marker-pens, templates) are unscripted, since they have not been purposefully designed for, and temporally and physically situated in, this specific interaction order (self-organized work). Because of this, the scripted relational dimension of these artefacts (e.g., writing and discussing together) also becomes lost, thereby leaving room for an emerging interaction order in which asymmetrical dynamics may dominate.

Unscripted and unsituated artefacts can also contribute, albeit indirectly, to the exclusion of participants. On day 2, in the final part of the session, a group of three participants, two women and one man (the same who, as mentioned above, had struggled with writing on Post-its without physical support) discuss which Post-its should be pinned on the map. The two women converse quite intensely on what to write. The man stands passively aside, but, at a certain point, manages to grab a Post-it. Access to and use of the Post-its represent ways of becoming an active part of the conversation—in other words, he gains access to the interaction order that emerged in the group over the preceding ten minutes (discussing, writing down on a Post-it, pinning it on the map). However, this interaction order can also have exclusionary effects if the use of artefacts is monopolized. The two women are very close to each other while discussing, because one holds the Post-it on which the other is writing. The discussion becomes a one-to-one conversation. No role is left for the man in this interaction order. While the two women continue their animated converse, he first checks his phone, and at a certain point moves away from them and returns to sit on his chair. While Post-its

are certainly not the only factor that contributes to this dynamic, they amplify his exclusion from the group, by depriving him of the "toy" that others are "playing with." The facilitator does not intervene. While this may be a personal choice by the facilitator, it is also possible to assume that this may have to do with the ownership of the interaction order's script. Not having taken part in the scripting phase of these "results' containers" may have left the facilitator without the necessary knowledge to intervene. As she later comments in an interview, '*If we don't accompany the process [from the beginning] but only run it, that's just something else.*'

4. Purposefully scripted and situated artefacts also require constant supervision by the facilitator, in order to embed them in their emerging interaction order—Artefacts are inevitably relational. This means that their use contributes to the constant emergence of new interaction orders among the participants, and that even purposefully scripted and situated facilitation artefacts may lead the group dynamic in another direction than was originally planned. The role of the facilitator thus consists of orchestrating—sometimes in the background, sometimes in a more explicit way—the directions taken by these emerging interaction orders.

On day 3, the facilitator who contributed to designing the "results' containers" during the scripting phase introduces them in the second part of the session. She divides the participants into two groups. Each corner has four chairs placed in a semi-circle in front of a pinwall displaying the map. On the floor, participants find the stickers (originally, the Post-its that the facilitator cut into five parts). The facilitator invites them to write down their ideas and pin them on the map. She explains the five categories and the possibility of identifying new ones. She encourages participants not to rush the process: '*There is enough time for this task; maybe you want to take some time to share your thoughts first. . .*' The facilitator, in this case, guides the participants in their use of the map and stickers. She foresees the potential rush and productivity dynamic that the task (writing down the ideas) may cause, and tries to avert the time pressure by suggesting a potential interaction order (first talking to each other, then writing) that the group may follow. In one of the two groups, after a short while, one woman stands up and starts writing some ideas on the stickers. However, even when she is not writing, she continues standing in front of the pinwall, speaking (30.4% of the group-work time, according to our coding analysis) and looking at the map, while everyone else remains seated. After some minutes, the facilitator intervenes and shares an observation with the group: if the woman stands, the communication takes place only between her and another participant. By standing, she inevitably shows her back to two participants of the group and indirectly cuts them out of the conversation. In this way, the facilitator indirectly asks participants to modify their way of interacting. The woman and the group seem to positively accept the facilitator's comment, and the woman sits down. She actively asks the other two participants whether they want to suggest some ideas. This interaction segment shows how the use of artefacts is constantly interconnected with and dependent on the facilitator and her work. Even when scripted artefacts are actively introduced and strategically situated in the flow of the process, those using them can interpret and use them in multiple ways, leading the interaction into unforeseen and potentially unproductive paths. With her intervention, the facilitator sees herself in charge of supervising, and eventually steering, the interaction between artefacts and participants on a relational level. Questions thereby become 'a possible means to exercise power' [86] in two different ways: firstly, the facilitator changes the conditions of the exchange among participants, by prompting reflection on the current group dynamic [87]; secondly, the previously standing participant, as a consequence of the facilitator's intervention, opens up the floor of discussion to the formerly excluded participants, by asking their opinions. One interviewed participant of the group finds a similar metaphor to describe her work as follows: '*Someone has to hold the rudder in this context. [. . .] if the facilitator does not pay attention, the topic can quickly glide into a different direction.*'

3.3.2. Inscribing: Between Frontstage and Backstage

'Whatever goes unrecorded during a participatory process will likely be lost for policy-making,' as Escobar states, referring to the process of inscribing in facilitation work [38] (p. 190). The "results'

containers" analyzed so far play a crucial role in this inscribing phase. In order to have an impact, they need to be scripted (which results do we want to document?), situated (how can we integrate them into the agenda in order for participants to productively use them?), and relational (who should be there while they are being produced?). We analyze this phase of inscribing by bearing in mind the fact that the three formats took place in a partly artificial context, in which each group could deliberate within a restricted amount of time and under special conditions (e.g., being filmed, partly working with unscripted and unsituated artefacts). The scripting phase shows that the "results' containers" were used, to differing degrees, in the ways they were scripted for. The photo documentation of all templates and maps produced by the three groups presents different kinds of depth (e.g., templates with sub-questions being left empty) and precision (e.g., large Post-its pinned around or on the map, hindering the precise localization of the individual ideas—see Figure 5).
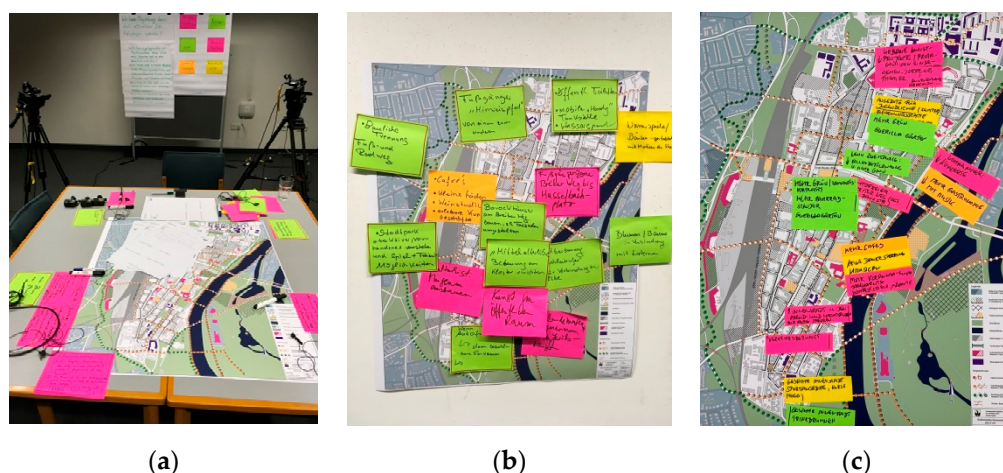

(**a**)　　　　　　　　　　　(**b**)　　　　　　　　　　　(**c**)

Figure 5. The results of the discussion visualized on the map on day 1 (**a**), day 2 (**b**), and day 3 (**c**).

Officials from the city development department seem not to see a challenge in the legibility of handwritten Post-its: '*We can actually deal with that [. . .]. We know this type of work and can therefore quickly move on to the next steps, and of course we will write it down neatly. [. . .] that is actually not a problem*'. Both facilitators retrospectively highlight the fact that the artefacts' relational quality would have benefited from the presence of representatives of the city development department during the deliberation. '*One of the persons I have missed was somebody who will work with the results [we produced] and who could have asked questions that we didn't think of, in order to really make sure that we collect proposals at the right level. Which level and which precision is needed now? Does it need the level 'We need more cafes' or does it need the precision of 'We need three benches on this crossing, and we need them with light'*'. Within this interview segment, the facilitator suggests that the presence of city officials in the room could have made it easier to increase the precision of the collaborative exercise's results and make them more likely to be implemented. Furthermore, the documentation also presents a relational dilemma: Who is in charge of interpreting what has been written on the templates and pinned on the maps? This question was posed by one of the facilitators to us, in the role of researchers and conveners, during an interview we conducted: '*I have this question: Is what has been produced during the three workshops so clear to you that you can present it [to the city administration]? Or how do you interpret the results? The city will also interpret them again, right?*' Since the beginning, the researchers saw themselves as being in charge of this inscribing process. However, now, with the raw data at their disposal, they find themselves at a crossroad, as one of them questions: '*How do we intervene in the content; do we paraphrase? Or do we really stick to the raw text?*' They finally choose the latter option, and generate a document that clusters the different ideas of the three groups while staying as close as possible to the words of the participants. All participants receive this document and have the opportunity to rate the different ideas. Based on the participants' responses to this survey, a report is sent to the City of Magdeburg.

By employing this approach, the researchers intended to remain neutral and refrain from translation. However, as Freeman underlines, 'to translate is not merely to "carry over", but to take over' [47] (p. 441). The role of translator has not been explicitly scripted or carried out by any involved party in the process under study. As there was no prior agreement on the process for this part of the procedure, the researchers assume a role similar to a gatekeeper of information without, however, offering an active translation.

4. Discussion

The pages above took readers on a micro-journey to the world of artefacts in collaborative settings and showed how the successes or failures of collaboration intertwine with seemingly insignificant minutiae. The detailed analysis of three interaction orders in our study illustrates and offers evidence of how, even in apparently controlled environments, emerging interaction orders can be volatile, quickly change direction, and are tightly entangled with material elements. The results of our study show that: (1) the presence or absence of artefacts in the room has a substantial influence on the structure of the emerging interaction order; (2) the very same artefacts are interpreted and used differently within different emerging interaction orders; (3) unscripted and unsituated artefacts might contribute to reinforcing those communicative patterns that collaborative interaction orders aim to contrast; and (4) purposefully scripted and situated artefacts also require constant supervision by the facilitator, in order to embed them in their emerging interaction order.

These arguments show that the micro-politics of socio-material arrangements do substantially matter in the overall collaborative practice, because they are consequential for the ways in which participants interact with each other. For this reason, the mobilization of each facilitation artefact needs to be systematically thought through in collaboration, and goes far beyond "making the room look nice and inspiring." In particular, we found that ownership of the interaction order's script, from scripting to inscribing, is crucial for its purposeful implementation. This refers especially to facilitators, who prove to have an irreplaceable role in orchestrating these micro-dynamics. However, it also implies co-ownership of the script by other co-conveners, which can emerge when the scripting phase becomes a platform for confrontation and mutual understanding among those with a stake in the upcoming steps of the collaborative process. In our case, the material constraints introduced by one of the conveners in order to fulfill their task in the process, namely the camera team, show the consequences of a lack of information exchange in the scripting phase. The episode illustrates how the presence of an unresolved difference in goals and priorities among conveners (the MDR camera team aiming to set up the space to obtain good-quality pictures *versus* the facilitators and researchers aiming to offer participants a productive environment for developing their ideas) unintentionally undermined the purposes of the entire collaborative arrangement.

Our analysis identifies three practices in facilitation work that deserve attention, in order to steer the emerging interaction order away from exclusionary dynamics: *scripting*, *situating*, and *supervising*. These practices, connected to the investigation of artefacts within the context of our case study, might extend to other (not necessarily material) spheres of collaboration. While scripting has been extensively tackled by Escobar as a key dimension of facilitation work [28,37,38], the other two practices emerged in our empirical investigation and are connected to two core properties of artefacts discussed above: situated and relational [48–51]. *Situating* refers to the practice of consciously placing facilitation artefacts in the room, both physically and communicatively, at the right time. In our case, facilitators "layered" their physical presence during the three-hour sessions, rendering visible only those artefacts that were necessary to orchestrate a specific activity. Other artefacts remained hidden, waiting for their time to come. This allowed for focus and avoided distraction. On a communicative level, facilitators often took several minutes to explain the use and role of artefacts and to suggest how participants could interact with them and with each other during the activity. When purposeful or extensive situating did not take place, for instance, in the self-organized group in which the "results' containers" were only briefly presented by a researcher before the group started its work, we observed how the

simple presence of Post-it notes in the room generated a different emerging interaction order, based on productivity instead of creativity. The practice of *supervising* focuses on the constant, dynamic interplay between the original interaction order and the emerging interaction order(s) among participants. The task of facilitators consists of steering, or adjusting, the emerging interaction order on a relational level in a way that it fosters inclusive and productive dynamics.

The empirical material generated in the study is based on the unique opportunity to analyze participants' deliberations on a real-life question under purposefully designed conditions. At the same time, high-quality video documentation enabled detailed analysis of each instant of the collaboration—a fundamental precondition when investigating micro-politics of facilitation artefacts. However, the same enabling conditions for this study also carry limitations. Deliberating for three hours in front of cameras, and knowing that some of these shots will be broadcast on national TV may have influenced the propensity of participants to behave in a certain way. These same conditions certainly contributed to self-selection among participants, thereby excluding those who were unwilling to be filmed. Furthermore, the setting's physical conditions—working in a small, warm room with subdued lighting, without being able to move freely—negatively affected the well-being of participants and facilitators. Finally, the low participant response rate—potentially also connected to the tight time schedule of the scripting phase—did not allow for organizing more than one group for each format. Additional groups would have provided a more robust basis for our analysis.

The four arguments formulated in this paper require further refinement and confrontation with other empirical cases and methods of analysis. The results of the investigation might also be framed as analyzing the unexpected side-effects of an "experiment." Researchers introduced a "fixed" variable (the "results' containers") in a highly dynamic and constantly changing environment that is a collaborative setting, by assuming that this variable could remain unchanged. As a side-effect, instead, the "results' containers" showed to be extremely volatile in their interpretation, use and impact on the overall emerging interaction order(s). If the exploratory study was to be repeated, a potential research design could include: (a) a self-organized group accessing a greater variety of facilitation artefacts, without the imposition of predefined categories; (b) a method-driven format, with the opportunity for the facilitator to participate in the scripting phase and co-design the facilitation artefacts; and (c) the presence of the question-giver (in this case, the City of Magdeburg) in the collaborative setting, in order to answer questions regarding the kinds of results to be produced. This way, the research design would attempt to remain even closer to the reality of daily collaboration and of the potential roles of artefacts within it.

The study of artefacts in collaborative settings could further benefit from analyzing our data from different angles and following questions that were beyond the scope of the present study. Our results hinted, for instance, to the crucial role of facilitators in actively working with facilitation artefacts, and to the potential influence of artefacts on fostering mutual understanding in diverse groups (e.g., the map of the city). Here, it would be of help to focus specifically on facilitators' perspectives and their active choices in working and interacting with the material world. This could be analyzed by comparing in-depth the conversation dynamics of the two facilitated formats and within the self-organized group.

5. Conclusions

A puzzling observation sparked the investigation: research in the field of collaboration has not dedicated substantive attention to the role of artefacts, whereas practitioners in the field consider them a key aspect of their facilitation work. Our work addresses this knowledge gap by showing the deep interrelatedness and embeddedness of artefacts in the social activities that are constitutive of collaborative arrangements.

The paper examines collaborative practices at a micro-level as an ongoing unfolding of activities, taking place in multiple contexts, which mutually and constantly influence each other [29]. In order to investigate them as such, we applied a heuristic that combines a temporal dimension (scripting, setting the stage, performing, and inscribing phases), a spatial one (frontstage and backstage work), and a socio-material one (scripted, situated, and relational artefacts). This framework enabled us to

track the ongoing interplay between: (a) the interaction order designed by the process designers, and (b) the emerging interaction order(s) of participants and other actors. While offering an approachable way to investigate the fine-grained interactions between social and material worlds, the significance of this study also relies on the explorative approach chosen to address the research question. It generated a mutual learning process across communities (researchers, facilitators, co-conveners, and participants) and produced relevant results for both scholars and practitioners in the field of collaboration.

Since sustainable policymaking at the national and global levels is ever more reliant on collaborative approaches, gaining an understanding of the micro-dynamics that shape these processes is fundamental to the future of environmental governance. Indeed, as we showed, what happens at the micro-level of collaboration can have a substantial influence on the impact that these arrangements might have (or not) on following policymaking processes. The investigation of fine-grained interactions between the social and material world can offer significant insights on a more abstract level and inform the processes of investigating, organizing, and conducting sustainability collaborations. Facilitation artefacts, indeed, should receive greater attention, as they represent the very core of the dynamics between the process design as scripted by its conveners and the emerging interaction order as co-shaped by participants. Our study shows that artefacts, as with every other dimension of collaborative processes, cannot be investigated (or, in the practice, organized) as separate entities, but need to be seen as parts of a whole orchestra playing.

Studying artefacts can reveal the origins and developments of dynamics that potentially lead to moments of collaborative advantage [12,13] or impasse [14]. As we have shown, collaborative impasse can emerge, for instance, when involved actors do not exhaustively formulate and discuss their respective priorities and interests in the scripting phase. In our case, this led to arranging the event setting in a way that spoke to the technical needs of the MDR team but negatively impacted the work of facilitators and participants. When asked about their first memory of the process they participated in, almost all interviewees spoke of the '*warm and stuffy room*,' which visibly affected the wellbeing of participants while deliberating. Similarly, the fact of buying the wrong material (large-sized Post-its rather than smaller stickers, as originally planned), caused by not knowing their precise scripted and situated purpose in the overall process, affected the quality of the documentation in the inscribing phase.

Collaborating to achieve sustainability goals implies the involvement of actors with much higher stakes than simply how to set up a room for recording a documentary. Nevertheless, the underlying dynamics may be similar. These episodes from the micro-level can be easily translated to inform other spheres of sustainability collaboration. Our heuristic and arguments, developed as a result of abductive grounded-theorizing, may offer some guidance and orientation for scripting, staging, performing, and inscribing collaborative processes, and the vignettes we illustrated may serve as a plastic example of dynamics that could take place in any collaborative setting. As demonstrated, collaborative advantage might be meticulously planned in the scripting phase. A good plan, however, must always include some mechanisms of responsiveness to account for unanticipated elements that—as experience shows—emerge before and during the performing phase. Above all, it needs to integrate the perspectives of its participants, with their backgrounds, experiences, and interests. Situating and supervising our collaborative practices along the path might represent two important missing pieces towards purposeful, legitimate, and productive collaborations, alongside others still waiting to be discovered.

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