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research article

Assessing the effectiveness of citizen participation: the development of an impact scheme

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This article examines the impact of participatory processes in research organisations, focusing on the 'Citizens' Dialogues' initiative at Karlsruhe Institute of Technology. As research increasingly embraces inclusive approaches, the article presents a scheme designed to evaluate the effects of such dialogues on different actor groups: citizens, scientists and institutional management. Drawing from both literature and practical experience, the scheme assesses immediate, gradual and continual impacts, offering insights into the effectiveness of participatory formats in shaping research agendas and promoting democratic engagement with academic research. Additionally, the article explores how this scheme can be applied to other contexts, enhancing the integration of participatory outcomes into research decision-making processes. By providing a structured approach to impact assessment, this work contributes to the broader understanding of how citizen participation influences scientific research and its societal relevance.

Keywords participatory research • Citizens' Dialogues • impact assessment
• research organisations

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Setting the scene

Participatory approaches have been employed in research to integrate non-scientific knowledge and empower the public to actively and substantially influence (research) decisions that may affect their lives (for example, [Fischer, 2000](#); [Chilvers, 2008](#); [Cornwall, 2008](#)). Such methods imply that individuals are not only present to listen but are also listened to, thereby leveraging perspectives and shaping outcomes (for example, [Rowe and Frewer, 2000](#); [Weinberger et al, 2021](#)). Besides this, they can also improve the accuracy and relevance of research (findings) and increase the

legitimacy and acceptance of related policies (see, for example, [Ladikas et al, 2020](#)). Based on these assumptions, participatory approaches have been applied in many different contexts and even on global levels (for example, World Wide Views).¹ In parallel, transdisciplinary approaches (approaches that integrate academic and non-academic knowledge production) have become integral to innovation policies within Europe as well as various national research and funding schemes. This is reflected in concepts such as Technology Assessment ([Grunwald, 2022](#)), Responsible Research and Innovation ([Von Schomberg, 2013](#)) and research approaches like Citizen Science ([Bonn et al, 2016](#)) and Real-World Labs ([Parodi et al, 2023](#)). Further, (European) research organisations frequently align their missions and research agendas with societal challenges, such as the climate crisis or ageing societies, and incorporate participatory elements into their agenda-setting processes. One example in this context is the initiative ‘Bürgerdialoge’ (Citizens’ Dialogues) at the Karlsruhe Institute of Technology (KIT) in Germany. These Dialogues, held annually at KIT, typically last about a day and are often scheduled on a Saturday to accommodate the weekend availability of community members and attract passers-by, as Saturdays are commonly days for shopping in the city, not far from the event location. Planning for these events begins well in advance, with a relevant and timely topic related to research questions relevant to KIT. The event is widely promoted throughout the city via posters, internet media, newspapers and word of mouth, aiming to mobilise as many people as possible to register for the Dialogue. The format of each Dialogue is carefully revised to ensure effectiveness, typically involving small group discussions where participants engage in conversations about various everyday topics with a technological focus relevant to KIT’s research. Breaks are provided throughout the day, with food and drinks available for participants. These dialogues focus on discussing current KIT research topics and activities with members of the local community, gaining insights into their perspectives to inform the setting of research foci.

Due to the growing societal and political interest in involving the public in research, participatory research must always be subjected to critical scrutiny. After all, participation can often act as a mere smokescreen or tokenism, designed only to give the appearance of engaging various social groups in research and its agendas ([Smith-Carrier and Van Tuyl, 2024](#)). Often, this is not genuine civil society participation but rather a façade with little to no real impact. This, among other things, motivates our own research interest: to examine whether the formats intended to enable participation are actually meaningful.

In this context, we found that previous evaluations have focused on quantitative metrics, such as participant numbers and satisfaction, without systematically capturing which topics were consciously excluded or which questions were not permitted ([Cooke and Kothari, 2001](#)). Critical reflection could be enriched by qualitative content analyses of the dialogue transcripts, for example, to shed light on the dynamics of discursive power. Assessing such impacts and thus demonstrating the effectiveness of participatory approaches in integrating societal aspects into the missions and research agendas of organisations like the KIT is crucial ([When et al, 2021](#)). Therefore, an integral part of the KIT Citizens’ Dialogues is the systematic tracking and assessment of their impact on various actors and (their) decisions. Assessing impact involves questions about the nature and extent of the effects or changes resulting from participatory processes, the prerequisites and influencing factors for achieving these effects, and the evaluation criteria and methods used to

identify them (Decker and Ladikas, 2004). Further, since the early 2000s, participation research has increasingly highlighted power asymmetries and exclusionary dynamics in engagement processes (Cooke and Kothari, 2001; Cornwall and Brock, 2006). For our Citizens' Dialogues at KIT, three interrelated dimensions are particularly salient:

1. *Power and discourse.* Drawing on Foucauldian insights (Foucault, 1977), participatory events are not neutral forums but sites where power is enacted (Cornwall and Jewkes, 1995; Cornwall and Brock, 2006). For instance, in the context of KIT's Dialogues, decisions about which voices are amplified, such as whether research staff or lay participants steer the conversation and which technological agendas even appear on the table, shape both the content and legitimacy of the outcomes.
2. *Inequality and representation.* Feminist and postcolonial critiques (Young, 2000; Fraser, 2008) warn that underrepresented groups often remain token participants, if present at all. In our context, this could mean that residents with non-academic expertise are present only to validate pre-set research assumptions rather than to co-define research questions that affect their everyday lives.
3. *Democratic legitimacy.* Deliberative democracy models (models of participation focused on inclusive, reasoned discussion and equal voice) (Habermas, 1992; Dryzek, 2002) demand not only inclusion but also fair rules, equal speaking time, transparent agenda-setting and genuine accountability for how citizen input influences research trajectories. Actual legitimacy in the KIT Dialogues will depend on whether participants see a tangible follow-up on their recommendations, not merely on the fact that they were 'invited'.

These are just some examples that can hinder successful dialogues. Furthermore, the impact of participation remains challenging to define and measure and is often only assumed or speculated on (When et al, 2021). The reasons for this are manifold: there is no universally agreed-upon definition of what constitutes the 'impact' of participation, which complicates efforts to measure and compare outcomes (for example, Abelson and Gauvin, 2006; When et al, 2021). Additionally, standardised frameworks and instruments for assessing impact are lacking, making it difficult to evaluate and compare various participatory research initiatives (for example, Concannon et al, 2014). Another challenge is attributing specific results solely to participatory engagement, as many factors and potential confounding variables can influence outcomes (Brett et al, 2012). Moreover, research institutions, such as universities, are complex organisations with diverse interests, values and beliefs that all shape their strategic agendas and research priorities. While individual researchers should maintain autonomy in their decision-making and research foci, citizen perspectives represent just one of many inputs in the broader decision-making process. As a result, fully understanding the impact of participatory processes requires navigating these multifaceted dynamics. Due to these challenges, it remains difficult to expect direct or measurable effects from single participation events. However, repeated participatory events might yield longer-term effects on researchers' perceptions of the relations (and boundaries) between science and society, potentially fostering greater awareness of the societal context of science (Owen et al, 2020). Such an awareness might reduce status differences between experts and laypersons, recognise the value of everyday and tacit knowledge, and shift perspectives on the societal relevance of research.

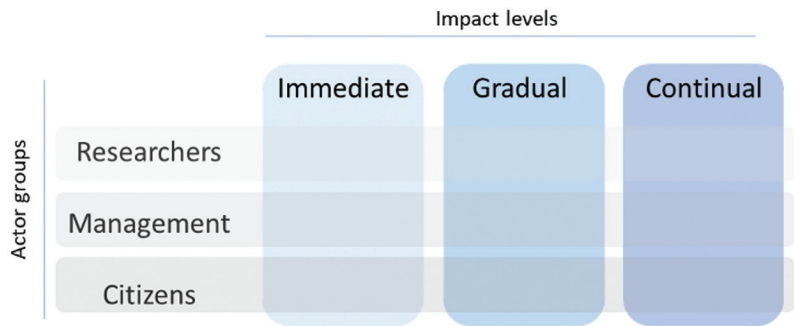
In light of this, our article aims to present the development and application of a comprehensive scheme for evaluating the impact of participatory processes in research settings based on experiences and insights gained during the Citizens' Dialogues at KIT. This nuanced framework enables the assessment of the effectiveness of citizen engagement across multiple dimensions, including immediate, gradual and sustained impacts on various actor groups (for example, researchers, citizens, experts, institutional stakeholders). A key aspect of this evaluation is the effect of participation on knowledge acquisition and perception, focusing on how citizens' understanding and viewpoints shift during and immediately after the dialogues. The scheme also considers long-term changes in participants' attitudes and behaviour, assessing how their perspectives on the issues discussed evolve and how these shifts translate into practical changes in behaviour. Additionally, it examines the influence of the dialogues on participants' decisions and actions, including how engagement leads to concrete outcomes in their personal lives, civic responsibilities or professional roles. By integrating findings from both literature and practical experiences, this scheme provides a systematic approach to measuring how participatory formats like Citizens' Dialogues influence research agendas, institutional decision-making and public engagement. This contributes to a deeper understanding of participatory research by offering a structured method for evaluating its impacts, addressing gaps in current assessment practices, and ultimately advancing the broader goal of democratising scientific research.

Evolution of the impact scheme

To move from vision to practice, the next step is to clarify what we mean by 'impact' and how our scheme took shape in response to both conceptual debates and real-world dialogue outcomes. We build on a broad understanding of impact as changes in knowledge, opinions or actions (Decker and Ladikas, 2004). For the development of our scheme and its goal of assessing impact, we use the following definition: 'Impact refers to the situated, multi-directional, and often non-linear contributions of participatory activities to shaping the capacities, discourses, decisions, and imaginaries of actors engaged in collective sense-making and governance of sociotechnical futures' (Sörgel, 2025). Thus, we use a broad definition of impact that encompasses changes on multiple levels.

Building on this definition of impact, we created a more detailed typology or framework of impacts. The resulting impact assessment scheme is structured with a horizontal axis categorising various impact types and a vertical axis distinguishing between crucial target groups of the Citizens' Dialogues (see the next section and Figure 1 for further details). To identify relevant concepts and indicators, we conducted a literature review on approaches and models for evaluating the success of participatory processes. Besides incorporating literature on participation more generally (Rowe and Frewer, 2004; Abelson and Gauvin, 2006; Mayne, 2012; Groß, 2018; Falanga and Ferrao, 2021; Schäfer et al, 2021; When et al, 2021; Somerwill and When, 2022; Vrydagh, 2022), we included work on university–community relationships to cover concepts that are unique to our context of Citizen Dialogues at a research university (Cherry and Shefner, 2004; Buys and Burnsall, 2007; Hart and Northmore, 2011; Rabinowitz-Bussell et al, 2020). In addition, we built on literature specific to the three dimensions outlined in the previous section. First, we referred to literature that points to interrelational power dynamics during and due to the event often reflecting, inter alia, marginalised groups, missing speaking ability, non- and misunderstood

Figure 1: Scheme's simple representation to illustrate its axes



(disciplinary) language, as mentioned earlier (Foucault, 1977; Cornwall and Jewkes, 1995; Young, 2000; Cornwall and Brock, 2006; Fraser, 2008). Second, to capture issues around inequality and representation, we drew insights from the literature on inclusion, extending to items on the fairness of participant selection and transparency of decision-making processes (Tyler, 2006; Pateman, 2012). Third, due to our interest in democratic engagement with research agendas, we also included literature from deliberative democracy research to measure democratic legitimacy and distributional justice, for example, when referring to deliberative balance, which refers to the proportion of speaking time not attributed to researchers (Gastil and Black, 2007).

This literature review resulted in several valuable indicators that were subsequently included in our impact assessment scheme. Overall, however, we found a lack of (well-defined) indicators, and most indicators needed adaptation for our specific context. In addition, the number of quantitative indicators regarding activities and outputs, assessing variables that are relatively easy to measure (for example, indicators to measure the number of participants or the number of publications during/ following an intervention), were much higher than indicators situated on the level of impact (for example, mutual learning between citizens and researchers) (When et al, 2021).² To address these gaps, we undertook an iterative process among the author team, involving several sessions dedicated to adapting, renaming, reorganising and condensing the indicators from the literature. This intense process enabled us to tailor the indicators to our specific context and develop a refined final set suitable for our evaluation framework. During the iterative development of the scheme, we encountered two major challenges. First, although various frameworks for evaluating participatory processes exist, we found that the available indicators in the literature often lacked specificity for assessing the nuanced impacts of Citizens' Dialogues. As a result, many indicators have been adapted, refined or newly developed based on practical experience and iterative feedback within the research team. Second, while the scheme was grounded in the context of KIT's Citizens' Dialogues, we aimed to design it with sufficient abstraction to allow for adaptation to different participatory settings. Balancing context specificity with broader applicability has required ongoing adjustments to the categories and indicators, as well as critical reflection on their generalisability. Addressing these challenges through continuous practical testing and team-based calibration sessions ultimately strengthened the scheme's robustness and flexibility.

In addition, practical experiences and insights gained from conducting the Citizens' Dialogues at KIT, as well as from many other engagement processes, have been incorporated into the development of the scheme. This encompassed the evaluation of the citizens' feedback, moderator observations and analyses of the content, as well as the results of the discussions. Practical insights of this nature provided invaluable perspectives into the actual effects and significance of Citizens' Dialogues.

In the following section, the article introduces this scheme, focusing on its scale of impact and detailing its development and layers. To ensure clarity and conciseness within the scope of the article, we present the scheme graphically, with attention to the most relevant categories and indicators. The fourth section discusses the exemplary application of the scheme about the temporal dimension of the impact scale, presenting preliminary evaluation results from a first practical test of the scheme in the Citizens' Dialogue context. Finally, the conclusions reflect on the lessons learned from these early evaluations, noting that the scheme remains a dynamic tool subject to ongoing refinement and potential further use in different yet similar contexts.

The scheme framework and methodology

While tailored explicitly to the Citizens' Dialogues at KIT, the proposed scheme aims to offer a more versatile tool for evaluating the effectiveness and significance of participatory processes across different contexts, levels, and target audiences when adapted. Beyond its primary purpose for evaluation, the scheme aims to enhance the quality and impact of dialogues by ensuring that the outcomes of these participatory processes are meaningfully integrated into problem-framing and decision-making. By facilitating a systematic and comprehensive approach to understanding impact, it supports continuous feedback and refinement, ultimately aiming to enhance the integration of results into KIT's management and strategic decisions.

The scheme employs a multi-method approach to collect data for the specific indicators, comprehensively integrating quantitative and qualitative methods to evaluate participatory processes. Quantitative methods include structured questionnaires administered before, during and after the events to gather demographic data and measure specific outcomes. Qualitative methods involve in-depth interviews and observations with citizens, researchers and administrators to capture nuanced insights into their experiences and perceptions. Additionally, ethnographic methods are used to observe interactions and engagement over time, providing a richer understanding of the Dialogues' impact. This combined approach allows for a robust and nuanced analysis, addressing both measurable data and contextual factors and ensuring a comprehensive evaluation of the Dialogues.

The scheme is structured into categories, which are further broken down into indicators, each measured using several items, including questions, statements, paper tracks, media analyses, data scraping, and other instruments. The scheme is organised into a tripartite impact scale along two axes. One axis categorises three main actor groups potentially affected by and effecting the participation exercise: the participating citizens, expert researchers and KIT management. The second axis represents three distinct impact levels over time: immediate, gradual and continual impact. This structure allows for a nuanced analysis of how each actor group is influenced across the three impact levels (Figure 1). The horizontal levels of the scheme represent different levels of impact that can develop during and after the participation process. For instance, 'immediate impact'

refers to observable changes during the Dialogue event itself, such as knowledge gains among citizens or effects on citizens' perceptions, which can be assessed directly through observations or on-site questioning. 'Gradual impact' refers to possible impacts that emerge in the period directly following the event, capturing shifts in attitudes among citizens attributable to the Dialogue. 'Continual impact', on the other hand, involves more long-term behavioural changes that may develop well after the event.

The terms 'immediate', 'gradual' and 'continual' were chosen, conveying varying time scales (for example, what effects occur during the dialogue event versus what happens after, for example, six months?) as well as the 'intensity' or 'persistency' of impact (for example, what takes longer to unfold?). While these levels may overlap and are challenging to delineate precisely, this approach aims to provide a holistic analysis of impact by considering these levels collectively, in addition to the horizontal time scale. Our scheme includes a vertical axis representing the main target groups of the Citizens' Dialogues: citizens participating in the event, scientists serving as experts on the topic, as well as KIT's administration and management, who are potential addressees of the recommendations. These directly involved stakeholders are deemed crucial for examining the direct impact of the participatory process, even if other actors may also be affected to some degree.

Specific categories have been developed for each impact over time (immediate, gradual and continual) and each actor group (citizens, experts and management). These categories are cross-referenced to double-check validity and accuracy. They present broader evaluation variables further specified by a combination of indicators measured through multiple items. For example, the category 'Multi-Directional Flow of Knowledge' (for example, how information or perspectives move between actors) aims to assess the quality of discussions during the citizen dialogue and the extent of a multi-directional knowledge exchange. The validity of these categories can be cross-referenced by evaluating the same variable from the perspective of different target groups, such as both citizens and scientists participating in the event.

These considerations illustrate the structure of the scheme and its application. Using our scheme to evaluate the Citizens' Dialogues, we aim to gain insights into the degree of participation of the different target groups, ranging from information uptake to elements of co-creation in decision-making. Furthermore, this helps measure how effectively the dialogues impact agenda-setting and research framing at KIT. It also provides insights into trust in institutions and awareness of specific research issues.

A closer look at the scheme

To better understand the scheme, this subsection presents several selected categories and their corresponding indicators developed throughout three Citizens' Dialogues (held in 2021, 2022, 2023 and early 2025 [instead of 2024]). These categories and indicators are selected based on their applicability to similar participatory formats, such as world cafés, citizen assemblies or round tables, and their alignment with the research questions we aim to address. Furthermore, these categories and indicators provide a comprehensive overview of the scheme's focus areas and the methodological approaches employed. Here, it is essential to point out that cross-check analyses are possible by validating indicators correspondingly. For instance, indicators such as 'flow of knowledge' or 'level of power dynamics' are assessed from both subjective

participant perceptions and our ‘objective’ observations as researchers. In this regard, ‘objective’ refers to the consensus among observers on describing particular conditions.

One of the most critical categories in the scheme is the ‘multi-directional flow of knowledge’ (see [Figure 2](#): ‘immediate impact’ for all actor groups: between citizens, researchers and management). This category highlights the exchange of knowledge between citizens and researchers, a fundamental aspect of fostering equitable collaboration. The category was further broken down, such as ‘knowledge exchange’ and ‘recognition of speaking ability’, that provide a detailed look at how effectively knowledge flowed among all actors and beyond.

We included this category in all actor groups to enable cross-validation, demonstrating how knowledge from different perspectives contributes to new insights and adjustments in the university’s research agenda. To operationalise the assessment of power dynamics during the Citizens’ Dialogues, we primarily relied on participants’ subjective perceptions captured through post-event surveys. These included questions about participants’ perceived ability to contribute equally, the extent to which they felt their views were acknowledged, and their perception of the overall inclusivity of the discussion atmosphere. In addition to these self-reports, ethnographic observations during the dialogues provided supplementary insights into conversational dynamics, such as moments where individual participants dominated discussions or instances where moderators actively supported balanced contributions. To systematically analyse the ethnographic observations, we developed a coding scheme in MAXQDA,³ combining both deductive and inductive strategies. Initial codes were informed by our theoretical framework, especially around concepts related to power dynamics, inclusion and knowledge exchange. These codes were then refined inductively through iterative readings of fieldnotes and transcripts. Multiple researchers independently applied the initial codebook to a shared subset of data in MAXQDA, followed by regular team sessions to resolve discrepancies and ensure calibration. Although we did not calculate formal inter-rater reliability metrics (for example, Cohen’s kappa), we used consensus coding as a qualitative validation strategy. This interpretive approach aligns with our constructivist stance, prioritising reflexivity and methodological triangulation over quantification. Trustworthiness was further ensured through analytical memo writing, ongoing reflexive team discussions and triangulation of diverse data sources (for example, surveys, moderator debriefs, fieldnotes), allowing us to capture both convergences and meaningful divergences in interpretation.

Another significant category is ‘researchers’ commitment’, which explores the depth and manner of researchers’ involvement in the Dialogue. It is a key category to assess the extent to which the Dialogues are taken seriously by researchers, their success in shaping research agendas, and for determining how the researchers’ engagement can be sustained over time. Indicators like the ‘number of involved researchers’, their ‘way of involvement’ and the ‘frequency of their participation’ offer a comprehensive view of the researchers’ dedication.

‘Influence on the research agenda’ is another critical category, examining the extent to which Citizens’ Dialogues outcomes affect the institution’s research agenda. This category is particularly significant because it reflects how public involvement can directly shape and drive scientific research. By assessing indicators such as ‘changes in research priorities’, we can demonstrate the tangible impact of participation and show that it influences the direction of scientific inquiry and thereby also ensures that research is responsive to broader societal needs.

Furthermore, insights into attitudes towards KIT and the Dialogue topics provide valuable information on the institute's integration into the community and the perception of its scientific efforts. This category includes indicators such as 'general evaluation of KIT', 'attitude towards KIT research' and 'perception of KIT engagement in the city'. Understanding these attitudes helps refine engagement strategies and improve the relationship between the institute and the public, fostering a more supportive environment for collaborative research.

The diffusion of the Dialogue results among peers measures how knowledge, insights and results are disseminated among citizens, as well as their influence on others' behaviour and opinions. Indicators such as 'dissemination of Citizens' Dialogues knowledge gains among peers' and 'influence on others' behavioural change' highlight the broader impact of the Dialogue. This diffusion is crucial for amplifying the Dialogues' effects and ensuring its benefits extend beyond the directly involved citizens.

These selected categories illustrate the scheme's approach to evaluating the dynamics of collaboration between researchers, citizens, and the university management, the effectiveness of the Citizen Dialogues, and their continual impacts on research and community engagement. They demonstrate a comprehensive approach to evaluating public participation in scientific research and its potential for broader application.

Despite the scheme's holistic approach, the authors acknowledge the challenges associated with the required resources for such an undertaking. As previously outlined, the scheme employs a multi-method approach, integrating both quantitative and qualitative methods. Quantitative methods, for instance, assess citizens' demographic data, while qualitative and ethnographic methods are employed over an extended period. This approach extends beyond the event's start and end, encompassing follow-ups with researchers, administrators and citizens – typically for about three-quarters of a year after the event. The follow-up period of approximately nine months was determined pragmatically, based on insights from our pilot implementations. It reflects the time typically needed to observe gradual and sustained impacts, such as evolving researchers' priorities or changes in civic engagement, which often unfold well beyond the event itself. However, we acknowledge that this timeframe may not be universally applicable, especially in project-based impact assessments. Shorter intervals (for example, one to three months) may suffice for capturing immediate outcomes such as knowledge uptake or participant satisfaction, whereas longer-term studies (for example, 12 to 18 months) may be more suitable for assessing institutional shifts or lasting behavioural change. The scheme is thus designed to be temporally flexible: users can adjust the duration and timing of follow-up depending on their evaluation goals, resource availability and the anticipated time horizon of impact within their specific context. This continuous data collection and analysis cycle also transitions into preparations for subsequent Citizens' Dialogues. This creates a cyclical monitoring and data collection process. However, this iterative process also sheds light on the complexities of measuring impact on various scales. Assessing impact can be challenging due to variations in the time needed for effects to become evident or manifest, the timing of these effects, or their intensity. These factors have implications for evaluating the actual effectiveness of the Citizens' Dialogues, underscoring the need for careful consideration of both timing and intensity when interpreting the data. Adapting and implementing the full scheme as presented requires substantial resources, including extended timeframes, dedicated personnel for data collection and analysis, and appropriate tools for both quantitative and qualitative assessment (for example,

MAXQDA). In our case, this involved a multi-disciplinary team of researchers and moderators, regular coordination meetings, and approximately nine months of data collection and follow-up. In resource-constrained settings, simplified adaptations of the scheme are possible. For example, using shorter feedback forms, focusing on a subset of impact categories (for example, immediate impact on citizens) and relying on structured moderator reflections instead of extensive ethnographic fieldwork can significantly reduce complexity. A modular application of the scheme, tailored to local capacities and available infrastructure or tools, may still yield valuable insights without necessitating full-scale implementation. We see this flexibility as key to the scheme's broader applicability across diverse institutional and geographical contexts.

Informed by practice: scheme application

We comprehensively applied the scheme as a guiding framework to evaluate the last KIT Citizens' Dialogue held in 2023 on the topic of 'Rewarding Climate Protection – But How?!' [translated by authors]. The selected categories and their indicators offered a robust structure for assessing various dimensions of the Dialogue, yielding several significant insights. Here, we exemplify categories and indicators used in this Citizens' Dialogue's case to highlight the scheme's methodological application possibilities as well as challenges.

First, citizens were predominantly homogeneous, consisting largely of middle-class individuals with academic backgrounds (indicator: demographic composition). This socio-demographic imbalance, which is not uncommon in participatory processes, provided a focused yet somewhat narrow perspective on the topic. It underscores the need for strategies to diversify participant backgrounds in future Dialogues (demographic diversification). Moreover, a noticeable gender disparity was observed, with approximately 70 per cent male and 30 per cent female citizens (gender disparity), and the average age ranged between 40 and 45 years (age distribution). This may call for more inclusive outreach efforts to balance gender representation and potentially include younger voices (Inclusivity). Besides this, the analysis of the socio-economic data shows that KIT's outreach efforts currently primarily attract individuals with academic backgrounds. The findings show that the event was mainly attended by people who have the flexibility and time to take part. Nevertheless, this time constraint is just one aspect of a broader challenge: ensuring that outreach efforts effectively engage a diverse range of citizens, including those with varying schedules and commitments.

Furthermore, many attending citizens had pre-existing connections to KIT, either through, for example, previous participation in scientific projects or attendance at other university events. This influenced their engagement levels and understanding of the Dialogue's context. A significant proportion of citizens already had an interest in climate protection (pre-existing interest), likely facilitating deeper and more informed discussions. This observation suggests that event promotion may play a relatively minor role, as citizens tend to attend scientific events, particularly the Citizens' Dialogue, due to their established connection with the institution and their pre-existing interest in the topic(s). In summary, while the event fostered valuable discussions, it primarily attracted a homogeneous group of academically inclined participants, reflecting the university's tendency to engage individuals already within its academic sphere. This focus on knowledge-sharing, while effective for some, inadvertently overlooks the

inclusion of underrepresented groups. Although the invitation is extended broadly, it often resonates most with those pursuing their own academic interests rather than reaching individuals who remain outside these established networks. This led to an ongoing question for upcoming Citizens' Dialogues: how can we better integrate underrepresented groups into these types of events?

While these Dialogues yielded rich insights, it is important to recognise that the relatively homogeneous participant composition may limit the generalisability of our findings. The perspectives captured likely reflect specific social, cultural and educational experiences that may have shaped both the dynamics of the discussions and the observed impacts. Particularly regarding indicators such as the 'flow of knowledge' and 'level of power dynamics', the relatively high level of familiarity with academic environments could have facilitated more confident participation and reduced perceived power asymmetries. Consequently, findings derived from this group may not fully represent the experiences or needs of more diverse or marginalised populations. These limitations underscore that the impact scheme, although systematically developed and empirically grounded, should be carefully adapted when applied to contexts with different participant demographics or engagement cultures. Beyond methodological limitations regarding generalisability, broader issues of inclusivity and structural access barriers also emerge from the analysis of participant demographics. These observations suggest broader structural barriers that likely influenced who was able to participate in the event. Factors such as time constraints, childcare responsibilities, financial limitations and transportation access may have systematically excluded certain social groups. As a result, the diversity of perspectives represented in the Dialogue may have remained limited. This raises concerns about the inclusivity and equitable reflection of societal viewpoints within the participatory process. Addressing these structural barriers is therefore critical not only for enhancing diversity but also for ensuring that participatory initiatives create space for a broader range of societal experiences and perspectives. In addition, the noticeable overrepresentation of citizens with pre-existing connections to KIT suggests that current outreach efforts may primarily engage familiar audiences, potentially limiting the institution's ability to build trust and establish a dialogue with marginalised or less connected societal groups.

Addressing these limitations involves not just enhancing public outreach efforts but also ensuring that these efforts effectively resonate with and engage a more diverse audience. Both aspects are interconnected, prompting us to consider which factors KIT, as a scientific institution, can better reach the broader population. We know that language plays a crucial role in this process (for example, [Erdocia, 2023](#)) (accessibility of communication). While communication accessibility is essential, it is even more critical to recognise that tailoring language to different communities is vital to reaching participants. This includes adjusting the language level, such as avoiding academic jargon and using discipline-specific terms, as well as considering the national languages spoken by various ethnic groups. Even if the entire event cannot be conducted in multiple languages, promoting it in languages that reflect the community's diversity is vital, as this initial outreach plays a crucial role in generating awareness and interest. Further, it is also crucial to implement diverse and inclusive advertising strategies. By adopting a range of promotional approaches that address various cultural, social and demographic factors, we can more effectively engage different cohorts of the population and ensure that outreach resonates with a broader audience (perception of KIT engagement in the city).

Turning to the atmosphere and content-related aspects of the event, it becomes evident that for meaningful exchanges to occur, the topics must be framed in a way that encourages discussion among citizens. This emphasis on discussion-oriented topics aligns with our findings that interactive formats are more effective in engaging citizens and fostering a productive dialogue (flow of knowledge; level of power dynamics). In this regard, it is necessary to have topics that allow for meaningful exchange and a participant group that inherently supports a diversity of opinions and an openness that considers every experience, perception and position as equally valid (level of power dynamics). To ensure meaningful exchange, it is essential to have third parties, such as moderators, who can intervene to point out that the question of 'right or wrong' does not play a central role in the discussions and who can promote an equal, fair and democratic exchange. In this context, we observed differences in the dominant behaviour of some citizens. While the variability in conversational behaviour is not a new finding (Schuerman et al, 2022), it is nonetheless a variable factor that influences the flow of knowledge and interaction among citizens. Both speakers should allow space for the exchange of knowledge and opinion exchange, as well as encourage interaction (flow of knowledge). Ensuring this diversity is crucial, as the atmosphere affects accessibility, learning behaviour and the overall mood, which in turn influences post-event behaviour, the perceived quality of the event and the organisational institution, and whether citizens are likely to attend another citizen event or similar participatory formats in the future (attitude towards the institution; attitude towards institution/KIT research; perception of KIT engagement in the city).

Furthermore, the scientific inputs provided during the Dialogue must be informative and challenging yet accessible to citizens. Balancing academic rigour with approachability is vital to maintaining participant engagement and facilitating inclusive exchange. Also, citizens highly valued the importance of the event and their involvement, particularly with the presence of KIT's Vice Presidents. This high-level engagement underscored the importance of the event, and citizens felt their input was crucial, especially as the formulation of research questions identified as relevant for future scientific endeavours by the citizens – one objective of the event – was presented to the Vice Presidents at the end of the event.

These exemplary findings from the Citizens' Dialogue 2023 underscore several key insights that are crucial for the success of future events and show the added value of applying our scheme. Demographic diversification is necessary, with future Dialogues aiming to attract a more diverse participant pool in terms of gender and background to enrich the perspectives and solutions to societal challenges. Inclusive outreach strategies are essential to engage individuals with no prior connection to KIT or limited knowledge about Dialogue topics such as climate protection, potentially through targeted outreach and educational initiatives. Emphasising discussion-oriented topics and interactive formats can enhance participant engagement and ensure a richer exchange of ideas (flow of knowledge; level of power dynamics). Additionally, scientific inputs should strike a balance between rigour and accessibility to maintain interest and inclusivity. Lastly, involving institutional leadership significantly boosts the perceived importance of the Dialogue, motivating citizens to contribute meaningfully. Future events should continue to involve high-level stakeholders to reinforce the value of citizen contributions.

Building on these reflections, some feedback mechanisms have already been initiated to foster transparency and institutional learning. Selected findings from the

impact assessment were shared with participants via email. In addition, key insights, such as the desire for more inclusive framing and clearer articulation of participation goals, were taken into account during the preparation of the subsequent Citizens' Dialogue. The scheme's structure also enabled internal reflection among organisers, facilitating adjustments in outreach strategies, moderator briefing and topic selection. Additionally, the organising team made adjustments to accommodate a more diverse group of participants. While systematic participant feedback on the follow-up process remains limited, these initial feedback loops represent a step toward institutional learning and ongoing reflection.

Reflections and outlook

This article provides insight into the impact assessment scheme we developed for the KIT Citizens' Dialogues. As a methodological approach, the scheme is based on both literature and practical experience from the Citizens' Dialogues case study. As illustrated earlier, we believe it is a valuable tool for systematically measuring impact. Comprehensive methods for capturing and understanding the impact of participatory processes are still relatively rare. While existing literature acknowledges the need for effective impact assessment tools (Falanga and Ferrao, 2021; When et al, 2021), many tend to focus on limited and immediate effects of participation that are easy to measure quantitatively (Schäfer et al, 2021), as discussed in the first two sections of the article. Our scheme seeks to address this gap by providing a structured approach to evaluating participation initiatives and their impact. It also incorporates long-term impact indicators and the influence of power dynamics and entails a multi-method approach to collect quantitative and qualitative data. Furthermore, our approach has a distinct advantage, as it can examine the impact on different actors as well as the knowledge flow between these groups. This makes it relevant for various research communities, including Participation Studies, Science Studies, Real-World Labs and Living Labs, and Technology Assessment.

In this article, we presented the development and first application of such a scheme. To fundamentally understand the impact of KIT Citizens' Dialogues on different groups and the university's research agenda, there is a need for long-term and repeated assessments of a series of these Dialogues. The scheme is applied iteratively to assess the impact over time, enabling comparisons between different events and identifying long-term effects, such as the evolving relationship between the university and its surrounding community or the perceived value of citizen involvement by university administrators and researchers.

Although initially designed for a specific case study, the scheme provides a foundational framework that can be adapted for a broader range of participatory processes, enabling the measurement of both direct impacts and changes, as well as the integration of findings into future participation activities. For example, in a community-based participatory research setting addressing urban environmental justice, the scheme could be adapted by redefining actor groups to include community organisers, residents and local government representatives. Indicators might then be refocused to assess co-ownership of research agendas, shared decision-making in data interpretation and the local relevance of outcomes. Existing categories such as 'mutual learning' or 'influence on decision-making' could be reframed to track how scientific knowledge is recontextualised through lived experience,

and how community members influence the project's direction. Data collection in such settings might rely more heavily on facilitated workshops, photovoice or narrative interviews than on structured surveys. While the scheme's emphasis on temporality and actor diversity provides a robust conceptual scaffold, specific indicators and methods can be collaboratively tailored to the needs and capacities of community partners. Adapting the scheme's structure for application in a new setting would follow three main steps: First, the actor groups need to be redefined according to the context (for example, replacing 'institutional management' with 'community leadership' in a community coalition). Second, impact categories and corresponding indicators should be selected or adapted to match the specific goals, dynamics and timeframes relevant to the participation process. Third, suitable data collection methods (for example, surveys, interviews, observations) must be chosen to capture the defined indicators appropriately. While the basic logic of assessing immediate, gradual and continual impacts across actor groups remains stable, these steps ensure contextual relevance and methodological rigour. In this way, the scheme provides a flexible yet structured framework for evaluating citizen participation across different participatory environments. It is important to note, however, that applying the scheme across different contexts is not a straightforward transfer. Institutional settings vary widely in their governance structures, decision-making cultures and underlying power dynamics. In some cases, these differences might require not only a redefinition of actor groups and indicators but also significant modifications to the framework's assumptions about participation, knowledge exchange and impact pathways. Particularly in highly hierarchical or conflict-prone environments, additional considerations, such as asymmetries in influence, varying degrees of openness to external input, or institutional resistance, may necessitate deeper structural adaptations. A careful contextual analysis should, therefore, precede any application of the scheme to ensure its relevance and effectiveness. When thoughtfully adapted, the scheme offers a structured approach for fostering more effective, context-sensitive participatory processes and for strengthening the societal relevance of research and innovation initiatives.

In light of evolving participation formats, the scheme can also be adapted for digital and hybrid engagements. For instance, surveys and interviews can be administered via secure online platforms, while ethnographic observations can target aspects of digital interaction patterns, such as chat dynamics, turn-taking in video calls or strategies of digital facilitation. Indicators such as 'flow of knowledge' or 'power dynamics' can be reformulated to reflect platform-specific affordances (for example, who tends to dominate discussions on Zooms versus in face-to-face settings). While online formats may constrain informal exchanges and embodied cues, they can also broaden geographic reach and enable more flexible forms of participation. To ensure methodological robustness, adaptations should account for varying levels of digital literacy, access to reliable technology, and potential exclusion stemming from connectivity issues or limited familiarity and comfort with online tools. Such an adaptation enhances the scheme's utility across diverse contexts and participatory formats, such as Real-World Lab interventions, where workshops might explore behavioural acceptance or identify barriers to change. The scheme's adaptability also makes it relevant for examining power dynamics, participation conditions and the dissemination of information between different actors,⁴ where the scheme could measure how scientists reflect on their work's societal and ethical impacts over time.

Nevertheless, despite its strengths, the scheme also presents challenges, particularly in the selection of indicators. One notable issue is the difficulty in defining the time scale of impact. The categories of initial, gradual and continual impact represent changes over time but are not always easily distinguishable. However, the scheme's comprehensive approach mitigates the importance of these precise boundaries, as it allows for a nuanced understanding of impact over varying timeframes. Another challenge we highlighted is the literature on participatory processes, which often lacks detailed guidance on indicator development. This means the scheme requires tailored indicators specific to each engagement activity. It is essential to note that these challenges may necessitate additional resources and expertise to overcome, and they should be taken into account when implementing the scheme in a new context.

Another challenge of our approach is that emphasising the measurement of impact risks foregrounding the instrumental value of participation, meaning that participation is seen as a means to an end (Bidwell, 2016). In other words, participation might be seen valuable only if it produces observable effects or only if the impact of the Citizens' Dialogues is proven. If participation processes become *solely* guided by and evaluated based on these effects, organisations might overlook the intrinsic value of participation, that is, that from a normative perspective, participation is valuable as an end in itself, as 'the right thing to do' (Bidwell, 2016: 2), justified, for example, on the basis of people's rights to influence decisions affecting them, which are part of democratic values. This intrinsic value escapes measurement, but should be considered when deciding whether to engage in Citizens' Dialogues or not.

Future research might need to explore how feedback mechanisms can be integrated into the scheme to refine it and continuously improve the participatory processes. Long-term sustainability and the overall impact of citizen participation also warrant further investigation, particularly about their lasting effects on institutions and society. The scheme's integration of both qualitative and quantitative methods ensures a holistic assessment, and its application across different contexts will help evaluate its generalisability. Moreover, attention to power dynamics and their influence on participation quality and outcomes remains crucial for fostering equitable and inclusive processes. Addressing participant diversity should also become a central concern in future applications of the scheme, with particular attention to engaging broader sections of society and validating impact dimensions across different socio-demographic groups.

In summary, while the scheme has proven to be a valuable tool for evaluating the impact of specific Citizens' Dialogues, ongoing refinement and adaptation are necessary for its continued use. Beyond this, future development should expand its applicability to different contexts (within participatory research), integrate feedback mechanisms, and address the complexities of long-term impact and power dynamics.

Notes

¹ <https://wwwviews.org/>.

² Here, we distinguish between two different levels of effects of participatory processes: Outputs are the directly observable results that are delivered by participation, such as workshop documentation or evaluation reports (Schäfer et al, 2021). Outputs tend to be quantitatively measured and are typically easy to measure. However, outputs are not yet indicative of more fundamental effects or changes that occur during and after

participatory processes. To assess these, evaluations also need to capture changes in knowledge, opinions or actions (that is, impacts) (Decker and Ladikas, 2004).

³ MAXQDA is a proprietary software tool used to support qualitative and mixed methods research through systematic coding, retrieval, and visualisation of textual and other data formats.

⁴ <http://cns.asu.edu/research/stir>.

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Contributions

All authors co-developed the impact scheme and contributed to first and subsequent drafts of the manuscript.

FS: Led and conducted the empirical research over the past two years, including data collection and analysis. Building on a prior phase of data gathering by JH, NW and CM, FS contributed to the overall structure of the manuscript and all sections of the manuscript. FS focused on the second, third and fourth sections, in particular the embedding of the findings and their theoretical interpretation. She was responsible for the presentation of the updated impact scheme.

NW: Contributed to the overall manuscript drafting from the beginning and provided substantive feedback across multiple revisions.

JH: Helped design the empirical data collection, co-wrote and commented on various versions of the article from the beginning.

CM: Co-wrote the first and second sections of the manuscript and contributed to the revisions.

MM: Contributed to the revisions.

Research ethics statement

This study adheres to the Code of Ethics of the German Sociological Association (DGS). Formal research ethics approval was not required, as the empirical work did not involve the collection of sensitive or personally identifiable data. All interview participants gave informed consent, and individuals were always notified in advance when data was collected, such as during participant observation or statistical surveys. As no data were gathered that would allow conclusions about individuals, no formal approval process was necessary. In accordance with data protection regulations, participants may request to review the projects' data on-site at the Karlsruhe Institute of Technology (KIT).

Conflict of interest

The authors declare that there is no conflict of interest.

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