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Angaben zur Veröffentlichung / Publication details:

Hill, Miira. 2026. "The data interview: reflexive integration of large language models in qualitative content analysis." In *Understanding science with large language models?: Potentials for the history, philosophy, and sociology of science*, edited by Arno Simons, Adrian Wüthrich, Michael Zichert, and Gerd Graßhoff, 369–82. Bielefeld: transcript. https://doi.org/10.14361/9783839447529-369.

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The data interview

Reflexive integration of large language models in qualitative content analysis

Miira Hill

1. Introduction

The longstanding divide between qualitative and quantitative paradigms, often called the *paradigm wars*, emerged from fundamentally different epistemological assumptions about what constitutes scientific knowledge. Quantitative research, grounded in positivist traditions, emphasizes measurement, objectivity, and generalizability (Hammersley and Atkinson, 2007). In contrast, qualitative approaches privilege interpretive depth, contextual understanding, and the co-construction of meaning (Geertz, 1973). These methodological oppositions reached their height in the mid-twentieth century, with scholars contesting not only techniques but also the philosophical legitimacy of their opposed approaches (Adorno et al., 1993; Frisby, 1972; Popper, 1989).

Later developments in the sociology of science, especially interactionist ethnomethodological approaches and later actor-network theory, challenged the idealized image of scientific objectivity by emphasizing the material, institutional, and social practices through which knowledge is produced (Garfinkel, 1967; Knorr-Cetina, 1981; Latour and Woolgar, 1979; Lynch 2013). These perspectives paved the way for a reflexive sociology of science, recognizing that methods and tools are themselves embedded within social orders (Goffman, 1981; Knoblauch, 2025; Schütz, 1972).

With the introduction of digital technologies, research practice underwent another transformation. The "computational turn" (Berry, 2011: 1) and the rise of digital methods (Rogers, 2013; Marres, 2017) blurred the boundaries between qualitative and quantitative inquiry. Massive digital trace data and networked infrastructures have enabled large-scale analyses while raising new interpretive and ethical questions about data provenance, authorship, and meaning (Venturini and Rogers, 2019). The resulting hybrid or qual-quant methodologies combine interpretive reasoning with computational tools such as data visualization and network analysis (Latour et al., 2012).

Recently, LLMs have introduced a new phase in this trajectory, reshaping how text, meaning, and context can be analyzed. In discussions about LLMs, it is frequently em-

phasized that they can play a crucial role in bridging the gap between computational and interpretive methods (Simons et al., 2026). This implies that LLMs can serve not only as technical tools but also as a means to enhance interpretive analysis in HPSS. LLMs seem to offer not only computational efficiency but also interpretive capacities that seem to merge quantitative scale with qualitative nuance (Simons et al., 2026). Nevertheless, their integration into social research raises critical tensions surrounding algorithmic opacity, platform dependency, and epistemic authority (Bender et al., 2021; Gerlitz and Rieder, 2018; Gillespie, 2024; Noble, 2018). Critical Data Studies has therefore emphasized the importance of reflexivity, transparency, and ethical awareness in computational inquiry (Dalton et al., 2016). It is within this context that the Empirical Theory of Science (EToS) offers a distinctive HPSS framework for analyzing how knowledge is produced and stabilized through communicative practices, institutions, and infrastructures, and how boundaries between scientific and non-scientific knowledge are negotiated (Knoblauch, 2017, 2025). Qualitative research offers context and meaning-making as a counterweight; reflexivity (Knoblauch, 2025: 34) requires LLM research to critically assess its conditions, including infrastructure that shapes data management.

This paper introduces the data interview, a reflexive, mixed-methods framework based on RAG, to address these challenges. We conceptualize LLMs as socially situated epistemic actors rather than neutral instruments. By treating their outputs as dialogical artifacts that invite interpretation rather than deliver answers, we seek to combine computational scale with interpretive depth, moving toward a reflexive, context-sensitive, and methodologically grounded digital social science.

2. Theoretical background

2.1 Knowledge

The question of what counts as valid knowledge, and how it should be produced, remains central across disciplines such as historiography, philosophy of science, and social sciences (Berger and Luckmann, 1967; Schütz, 1972). Building on the paradigm debates outlined above, scholarship has highlighted that claims to "objectivity" are themselves historically situated and socially negotiated. Historically viewed as wise scholars cultivating nature's variability, scientists saw the source of epistemological uncertainty shift from nature to the self-eliminating scientific self by the 19th century (Daston and Galison, 2007: 198). Self-elimination and suppression of subjectivity became central ideals, sidelining emotion in favor of rigor. This culminated in mechanical objectivity (cf. Daston, 2001: 153), a paradigm prioritizing minimal human intervention through machines (e.g., photography, instruments) to capture phenomena 'as they are'. Scientists adopted passive roles, presenting raw, unaltered outputs as transparent records as if they were free from interpretation or aesthetic adjustment. The aspiration toward scientific passivity and neutrality was challenged by HPSS, particularly its emphasis on science as an interpretative, reflexive, and socially embedded practice.

Building on the recognition that all knowledge is socially situated, historians and theorists have reexamined how power, discourse, and technology mediate the construc-

tion of the past. Foucault's Discipline and Punish (1977) disrupted traditional, teleological historiography by foregrounding discursive discontinuities and the institutional production of "regimes of truth". For Foucault, what is legitimized as "history" is inseparable from the epistemic configurations and power relations that define its conditions of possibility. Building on similar arguments, postcolonial and decolonial theorists such as Chakrabarty (2013) and Mignolo (2021) have revealed how dominant historical narratives remain anchored in Eurocentric epistemologies that universalize European categories of "modernity", "rationality", and "time". These frameworks often render non-European histories legible only as deviations or lacks, denying epistemic plurality. Within HPSS, subjectivity is analyzed not as bias but as a historical and constitutive process in knowledge production, aligning with qualitative research traditions (Flick et al., 2004; Flick, 2006).

Building on the social construction of reality (Berger and Luckmann 1967), which models how knowledge gains legitimacy, communicative constructivism emphasizes the procedural, dynamic nature of this construction. EToS utilizes this perspective to analyze how social realities are communicatively produced, shaped by interaction and material infrastructures (Keller et al., 2013). Resonating with Knorr-Cetina's (1999) concept of epistemic cultures, EToS reframes scientific knowledge as a communicative process mediated by historical and infrastructural conditions, directly engaging HPSS debates. Central to EToS is its social concept of knowledge: scientific knowledge emerges through socially validated objectivations (data, theories, instruments), not individual neutrality (Knoblauch, 2025: 5). EToS foregrounds several issues. First, EToS tackles the challenge of distinguishing scientific knowledge from non-scientific forms, especially salient in the context of post-COVID-19 new realism, anti-constructivism, and concerns about value intrusions compromising scientific integrity (Knoblauch, 2025: 39). It examines boundary work at micro, meso, and macro levels. This involves the negotiation and defense of the boundaries between science and non-science to secure scientific autonomy regarding research topics, methods, and findings against political, economic, and social influences. This process is shaped by norms (altruism, skepticism) and everyday rationalities (Merton 1942; Knoblauch, 2025: 42). Second, EToS views scientific knowledge as dynamic, evolving through continuous critique and adaptation. It champions reflexivity, where scientists critically reflect on their research processes, methods, and the societal implications of their work. This approach pushes beyond mere critique of results to include an examination of the procedures and the act of critique itself. This means that science as a social endeavor requires continuous scrutiny of its methods, theories, societal entanglements and consequences (Knoblauch, 2025). And that it employs a methodology that empirically studies how social science methods function in practice, moving beyond theoretical prescriptions to address HPSS critiques of positivist detachment and center interpretation as crucial for rigor (Knoblauch, 2025).

Having clarified the theoretical framework underpinning the argument, the next section presents perspectives that illuminate the challenges of using LLMs as a methodological tool.

2.2 Large language models and methodological challenges

It seems as if the legacy of mechanical objectivity finds renewed expression in the rise of machine learning and LLMs. Like the nineteenth-century ideal of the passive observer, these systems are often portrayed as "neutral experts", capable of scalable, consistent, and reproducible pattern recognition across massive datasets (Schwitter, 2025; Selby et al., 2024). Nonetheless, this promise of neutrality has come under increasing scrutiny (Jacomy and Borra, 2024, Saba, 2023). Studies have revealed that LLMs frequently exhibit overconfidence, opacity, and epistemic instability, raising concerns about their transparency and validity as instruments of knowledge production (Ghafouri et al., 2024). Lin et al. (2025) demonstrate that the reliability of LLM-based classifications in social science varies with task complexity. Moreover, the proprietary infrastructures underpinning these models obscure critical questions about data provenance and interpretive accountability (Ji et al., 2023; Kapoor, 2024). This directly engages the demarcation problem, as opaque infrastructures blur boundaries between scientific and commercial knowledge regimes, complicating HPSS concerns about institutional independence (Knoblauch, 2025).

Far from being neutral tools, LLMs encode and reproduce the social, political, and economic asymmetries embedded in their training data (Stammbach et al., 2024; Goldshtein et al., 2024). Such biases are not mere technical flaws but reflect deeper forms of epistemic injustice that privilege dominant languages and worldviews (Helm et al., 2024). As Poibeau (2024) argues, such "biases" in LLMs must be understood as expressions of their social contexts. Resonating with EToS, this shows how macro-level boundary work (e.g., corporate AI governance, data ownership regimes) mediates epistemic authority, determining what counts as "valid" knowledge while obscuring power asymmetries (Knoblauch, 2025: 39).

Against this backdrop, qualitative research offers a vital counterweight by attending to context and meaning-making. Its focus on reflexivity (Knoblauch, 2025: 34) demands that LLM-based research critically examines its own conditions, including how infrastructures shape data hermeneutics and power relations. In emerging hybrid methodologies, scalability must be paired with reflexive engagement, treating LLMs not as oracles but as sociotechnical actors requiring dialogical accountability.

The data interview approach embodies this EToS-informed reflexivity by framing LLM outputs as dialogical artifacts, socially constructed objectivations, enabling critical co-analysis of how knowledge is negotiated across human/machine boundaries. Digital infrastructures, from search engines to social media platforms, increasingly shape how historical knowledge is produced, circulated, and archived.

Our study employs LLMs to examine how such knowledge dynamics unfold in the digital public sphere, specifically in how historical narratives are articulated on platforms like Facebook (Hill and Puschmann, 2025). Using LLM-assisted analysis, we identifed thematic patterns and rhetorical strategies in user-generated content that contribute to the construction of collective historical meanings and identities. A recurring motif across these narratives was the nostalgic idealization of a morally superior, homogeneous past, a discursive move that underpins nationalist and conservative imaginaries rejecting pluralism and democratic contestation. This nostalgia-driven framing not only

simplifies complex social processes like migration and cultural change but also delineates symbolic boundaries of belonging, excluding dissenting voices and marginalizing minorities. Through this lens, LLM-assisted analysis was helpful to detect linguistic patterns. It revealed how digital infrastructures and user generated discourses co-produce exclusionary imaginaries.

3. Retrieval-augmented generation (RAG)

RAG represents a methodological development in computational text analysis (Lewis et al., 2020). This hybrid architecture combines a generative language model with a retrieval system that accesses external sources, ranging from public repositories like Wikipedia to researcher-curated datasets, to incorporate contextual knowledge into its outputs. By dynamically integrating retrieved documents, RAG aims to enhance standardization and reproducibility compared to conventional LLMs reliant on static pre-trained knowledge. This approach may reduce reliance on potentially outdated information and could be advantageous for tasks requiring current or domain-specific knowledge. It offers a framework for integrating large-scale pattern detection (distant reading) with context-sensitive analysis (close reading) (Simons et al., 2026).

Figure 1: Overview of the RAG approach from Lewis et al. (2020)

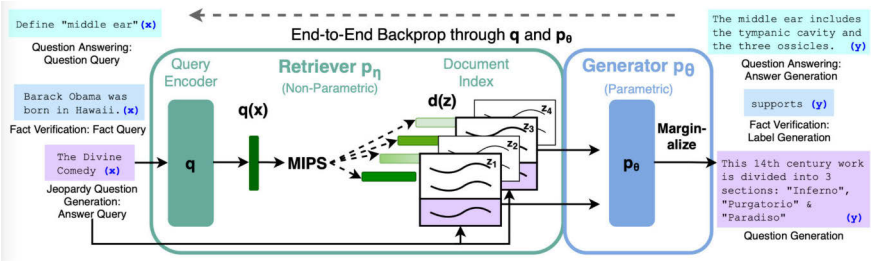


Figure 1 taken from Lewis et al. (2020)

Commercial implementations (e.g., Cohere AI's Command-R, 2024) enable flexible retrieval across public/private sources, presenting potential applications for hypothesis generation and iterative interpretation (Krähnke et al., 2025). RAG-based applications are today integrated into many common data processing software programs (e.g., MaxQDA). Still, RAG's epistemic validity is contingent. Its outputs are shaped by researcher decisions (source selection, curation), institutional factors (access to proprietary databases), and socio-technical infrastructures (ranking algorithms, data availability) that govern knowledge retrieval and contextualization.

In this perspective RAG exemplifies relational knowledge production, where machine outputs remain intertwined with socially shaped communication. Within an EToS perspective, RAG scales interpretive practice but does not replace human understanding; it expands opportunities for reflexivity regarding knowledge selection

and legitimization. RAG occupies an epistemic middle ground, underscoring that researcher judgment and reflexivity are constitutive of knowledge production. It renders visible the sociotechnical negotiations inherent in constructing meaning within digital scholarship. These tools simultaneously necessitate critical scrutiny of data quality, transparency, and epistemic responsibility. Validation becomes dialogical, interrogating both what is retrieved and how it is legitimized as insight (cf. Meding and Daugs, 2026).

Following this overview of RAG, the next section describes its application in the data interview methodology.

4.The data interview

Building on the epistemological critiques outlined above, this study applies a hybrid, reflexive methodology centered on what we term the data interview. Rooted in RAG, this approach tries to combines the scalability of automated language models with the interpretive depth of qualitative inquiry. The data interview does not treat model outputs as neutral findings, but as dialogical materials generated in response to formulated research questions and subsequently subjected to critical, interpretive scrutiny. Below, we outline the process step by step to facilitate transparency and reproducibility.

Data Collection and Corpus Construction: The dataset used in our study consists of public comments posted on Facebook between 2010 and 2019, collected from German-language political groups. These groups represented a range of political perspectives, primarily focused on right-wing populism, extremism, and grassroots movements. The primary topic of discussion in these groups was immigration, particularly in the context of the so-called European "refugee crisis" of 2015–2016. A significant portion of the comments expressed support for the Alternative for Germany (AfD), while others aligned with no specific political party. This diversity allowed for the exploration of various political discourses within the dataset. The data were gathered using Facebook's Graph API, a tool that, during the time of data collection (2015–2019), provided extensive access to public posts and comments.

4.1 Data preparation and structuring

In compliance with the General Data Protection Regulation (GDPR), all personally identifiable information was removed from the dataset. This included details such as user IDs, group memberships, and any identifiable metadata. Furthermore, to protect user privacy, any non-essential metadata was deleted from the final dataset, leaving only the comments and their corresponding post dates. The raw text corpus was processed into machine-readable formats (e.g., .csv) compatible with standard natural language processing workflows.

4.2 Sampling

From an initial dataset of 2.5 million comments, we then sampled the material. First, we selected comments containing a set of keywords based on relevance to our research topic (see Table A). We also excluded very short and very long comments. We then drew eight random samples of 5,000 comments each.

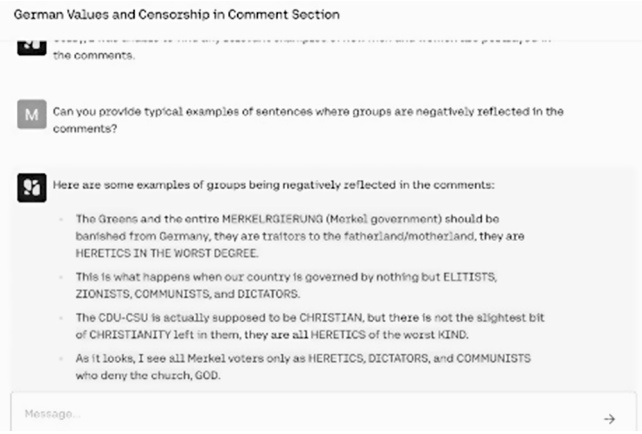
Table A: Terms used to sample Facebook comments

altparteien	europa	juden	politische
angst	familie	kind	politischen
arbeit	flüchtlinge	kinder	polizei
arbeiten	flüchtlingen	kindern	putin
asylanten	frau	kirche	rechte
ausländer	frauen	kosten	regierung
bevölkerung	freiheit	krieg	religion
bezahlen	geld	kultur	russland
brd	geschichte	land	sicherheit
bürger	gesellschaft	leben	staat
christen	gesetze	macht	staaten
damals	gewalt	mann	system
ddr	gewählt	medien	usa
demokratie	glauben	meinung	volk
deutsch	gott	menschen	wahlen
deutsche	grenzen	migranten	wahrheit
deutschen	gutmenschen	moslems	welt
deutscher	heimat	muslime	wählen
deutschland	heute	männer	wähler
deutschlands	islam	nazi	zeit
ehrlich	jahr	nazis	zukunft
eltern	jahre	politik	
euro	jahren	politiker	

4.3 RAG-driven data interviews

Each of the four team members conducted two data interviews with the data based on RAG, asking it a set of questions related to the style and content of the comments. Researchers formulate open-ended questions based on the research focus (e.g., "How is migration discussed in the data?"). The model responds by retrieving relevant content from the dataset and generating answers. These responses simulate semi-structured interviews, with the dataset itself as the interlocutor. This process was dialogical and iterative: researchers engage the model in multi-turn exchanges, refining prompts, questioning outputs, and triangulating responses. The result is a corpus of model-generated texts that reflect both computational synthesis and researcher-led framing.

Figure 2: Screenshot of the data interview



4.4 Thematic coding and interpretive synthesis

Model outputs underwent collaborative open coding following qualitative content analysis principles (Kuckartz, 2012). Crucially, coders cross-verified each response against the other interviews to assess grounding in original comments, revealing instances where model summaries inadequately reflected input data. Through iterative discussion and comparative analysis, themes (e.g., nostalgia, moral decline) were refined into higher-order constructs.

5. Limitations

While RAG enhanced scalability in our mixed-methods approach (via source citation tracing, team interpretation, and subsample comparisons), three key limitations persisted: classification accuracy, example diversity, and normative bias. These challenges directly engage core concerns of EToS regarding the boundaries, reflexivity, and infrastructure-dependence of knowledge production (Knoblauch, 2025).

5.1 Challenges in classification

Despite generally strong performance with informal, digital language, the model occasionally misclassified comments, especially when data lacked sufficient context or interpretive cues. In some instances, the LLM assigned texts to themes that did not align with human interpretations or cited comments that appeared irrelevant, overly general, or insufficiently grounded in the underlying discourse. While adjusting prompts and providing more precise instructions improved classification precision, misinterpretations could not be eliminated. These episodes underscore the limits of automated pattern recognition in capturing subtle contextual and rhetorical cues central to qualitative analysis. These instances also underscore the demarcation challenge in defining knowledge/non knowledge under computational conditions as opaque infrastructures

blur boundaries between scientific and commercial knowledge regimes (EToS Demarcation Problem).

5.2 Limited diversity of illustrative examples

A further limitation involved the model's tendency to reuse identical or near-identical examples across multiple themes, even when these categories were conceptually distinct or even in tension with one another. This repetition of "evidence" risked flattening thematic variation, thereby reducing the representativeness and interpretive depth of the analysis. In response, we revised the examples, thereby reinforcing the negotiation and defense of the boundaries between science and non-science (EToS Demarcation Problem).

5.3 Normative bias and ethical concerns

Particularly in dealing with sensitive or extreme content, the model exhibited normative blind spots. On several occasions, it reproduced problematic rhetorical structures, for instance, by presenting extreme or discriminatory views in a falsely balanced tone, implicitly legitimizing them as equivalent to mainstream positions. This false balance effect required active researcher intervention to identify and correct such distortions. Moreover, the model sometimes downplayed the severity of offensive or exclusionary language, further highlighting the need for critical human oversight.

These limitations are not unique to LLM-based approaches. Human coders likewise grapple with ambiguity, bias, and inconsistency in interpretation. However, the opacity and scale of LLMs necessitate layered validation strategies. Our approach included multiple, independently conducted data interviews, cross-checking of model outputs, and iterative team-based refinement. These practices helped mitigate distortions and enhance the reliability and accountability of our findings.

Beyond these interpretive issues, broader ethical considerations arise from deploying proprietary LLMs in social research. Issues of data privacy, algorithmic opacity, and potential commercial exploitation cannot be overlooked. While we ensured full anonymization and removed identifiable metadata, the commercial use of third-party LLM systems raises unresolved questions around ownership, consent, and the governance of sensitive digital content. Researchers must thus treat LLMs not as neutral tools, but as sociotechnical actors requiring critical co-governance.

5.4 Reflexivity

Engaging with LLMs and expansive digital datasets has introduced a profound shift in the role of the qualitative researcher. Khutsishvili (2026) diagnoses a profound destabilization of the scientist's role: As AI emerges as a new agent of epistemic authority, the human researcher loses their position as the undisputed "generator and guardian of knowledge" challenging not just professional relevance but the very philosophical self-understanding of the scientist. This crisis of epistemic agency raises the existential question central to our era: What remains for the scientist to be when machines occupy the

locus of knowledge creation? Correspondingly, in this study the role of the researcher is challenged. While the capacity to work with vast volumes of user-generated content offers new analytic possibilities and scope, it simultaneously introduces tensions that cut to the core of qualitative epistemologies. One central challenge lies in managing the dynamic between human and computational verification. Although LLM-generated responses can surface thematic patterns and guide interpretive exploration, they cannot be accepted at face value. The researcher's role is thus reasserted not as a passive recipient of machine outputs, but as a critical interpreter who systematically verifies these responses against the primary corpus (EToS Reflexivity). This entails ongoing engagement with context, subtlety, and ambiguity, dimensions that often escape RAG driven reduction. In this sense, qualitative researchers act as epistemic safeguards, ensuring that meaning is not flattened in the name of computational efficiency.

A further transformation emerges in the researcher's role as a curator and cleaner of data. Working at digital scale requires active stewardship: identifying noise, inconsistencies, and irrelevant data points that could distort interpretation. This often-invisible labor of dataset refinement extends traditional responsibilities and reflects the growing entanglement of qualitative inquiry with data infrastructure. The qualitative researcher becomes a critical curator, not only between data and theory, but also between data and platform logics.

At the same time, many researchers experience a shifting sense of ownership and control. Proprietary and often opaque, LLM systems mediate knowledge production in ways that can obscure the boundary between human insight and RAG synthesis. This raises intellectual and ethical questions about autonomy: Who authors the analysis? Who bears responsibility for its claims? These concerns invite continued reflexivity about the distribution of agency within LLM-assisted research.

Despite the affordances of automation, the irreplaceable value of human-centered methods remains. Interviews, ethnographies, and participant observation capture lived experience, affect, and context in ways that LLMs cannot replicate. These practices are not residual but foundational, anchoring the interpretive depth and relational reflexivity that define qualitative research. What is at stake is not whether digital tools will replace such methods, but how they are integrated without eclipsing the human dimension of inquiry. Navigating this evolving terrain demands a careful balancing act.

6. Conclusion

At the heart of this study lies the data interview: a hybrid methodological practice integrating RAG into qualitative workflows. LLMs might expand interpretive research by automating pattern detection and preliminary structuring of large corpora, enhancing efficiency when rigorously validated. Nonetheless human oversight remains indispensable for contextual synthesis, ethical judgment, and critical infrastructure awareness. Our analysis reveals that integrating RAG into qualitative workflows, while enhancing scalability through citation tracing and team interpretation, confronts irreducible limitations in classification accuracy, example diversity, and normative bias. These challenges are not merely technical but epistemologically constitutive: they expose demar-

cation problems in defining valid knowledge (e.g., misclassifications blurring context-dependent meaning), necessitate ongoing negotiation of evidence (e.g., curating repetitive examples), and demand vigilant ethical intervention (e.g., correcting false-balance distortions) (Knoblauch, 2025). Moreover, our approach advances a call to historicize digital knowledge production. Echoing Foucault (1977) and Chakrabarty (2013), we situate LLMs within their historical and political conditions of emergence. Rather than treating RAG as a neutral innovation, we frame it as part of ongoing struggles over knowledge legitimization and circulation. Thus, the data interview does not merely use LLMs to study history, it positions LLMs themselves as historizing entities.

Throughout our analysis, we treated LLM responses as provisional objectivations: prompts for critical engagement rather than truth claims. Drawing on EToS, we conceptualized LLMs not as neutral instruments, but as sociotechnical actors embedded in normative frameworks, institutional agendas, and communication practices. Consequently, the researcher's role transformed from an "mechanical" or "objective" interpreter to an interested epistemic safeguard: verifying outputs against primary data, stewarding dataset integrity, and maintaining dialogical accountability. This redefined agency, though destabilized by LLMs encroachment on knowledge production proves indispensable (Khutsishvili, 2026). Human sensemaking remains the anchor for contextual nuance, ethical synthesis, and infrastructural critique. By treating LLMs as collaborative provocateurs, not autonomous analysts, we leverage their capacity to scale inquiry while anchoring knowledge production in the interpretive rigor demanded by qualitative traditions and EToS.[1]

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1 This chapter was written with support from Large Language Models (LLMs). All ideas and human-generated text were reviewed by LLMs and revised where necessary. The authors bear full responsibility for the final version. For details on the use of LLMs in this volume, see the statement in the volume's introduction.

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