

The Shape of Agency: Designing for Personal Agency in Qualitative Data Analysis

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ABSTRACT

Qualitative researchers increasingly rely on computational tools to analyze large text corpora, creating opportunities for scale but also raising concerns about loss of control, transparency, and interpretive authority. In this work, we examine how *personal agency* can serve as a design lens for qualitative data visualization tools. Using a design science research approach, we conducted interviews with five qualitative researchers to identify agency-related breakdowns in existing tools, developed a design probe embodying agency-driven interaction commitments, and gathered follow-up feedback using the probe as a concrete design artifact. Our findings show that researchers value tools that preserve interpretive control while providing structured guidance and transparent delegation of analytic tasks. Rather than proposing a full AI system, we contribute design knowledge about how interaction structure can support mastery of action, choice, narrative, and space in computationally supported qualitative analysis. These insights inform the design of future qualitative visualization tools that aim to scale analysis without diminishing researcher agency.

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1 INTRODUCTION

Qualitative research enables researchers to examine meanings, experiences, and interpretations that are difficult to capture through purely quantitative methods. By engaging deeply with participants' perspectives and situating findings within social and contextual settings, qualitative approaches support rich understanding of complex phenomena [21, 24]. Such approaches are especially important in domains like health research, where understanding lived experience, interpretation, and context is central to both explanation and design [52, 56].

At the same time, qualitative analysis is often labour-intensive and time-consuming, particularly as researchers increasingly engage with large-scale datasets drawn from digital and online sources [29,

33, 34, 40, 54]. Computational tools and data visualizations are frequently proposed as ways to support pattern recognition, exploration, and sensemaking at scale [13, 15, 35, 39, 42]. However, these tools can also introduce new challenges: researchers may feel constrained by opaque workflows, fixed analytic paths, or automated processes that reduce their sense of control over interpretation. As a result, researchers may experience a loss of *personal agency* when working with large-scale qualitative data.

In this work, we examine how personal agency can be used as a design lens for qualitative data visualization tools. We focus on qualitative researchers' experiences using computational supports for thematic analysis, with particular attention to how interface design shapes their sense of action, choice, narrative control, and spatial understanding. We draw on Eichner's conceptualization of personal agency [26], which frames agency as the perceived ability to act meaningfully and see one's actions shape outcomes.

We adopt a design science research approach to translate this conceptual framing into concrete interaction design. Our process involved interviews with qualitative researchers to surface agency-related breakdowns in existing tools, the creation of a design probe embodying agency-driven design commitments, and follow-up interviews in which participants engaged with the probe and reflected on its interaction structure. Rather than proposing a full AI system, our goal is to articulate and validate design knowledge about how agency can be preserved when qualitative analysis is supported by computational and AI-assisted tools.

This paper makes the following contributions:

- (1) We demonstrate how *personal agency*, as conceptualized by Eichner [26], can function as a generative design lens for qualitative data visualization tools in HCI.
- (2) We articulate agency-driven design commitments for supporting qualitative analysis at scale, grounded in qualitative researchers' experiences.
- (3) We present and evaluate a design probe that embodies these commitments, using participant feedback to validate how specific interaction structures support agency.
- (4) We reflect on how agency-aware design can inform the development of future computational and AI-assisted qualitative analysis tools.

2 RELATED WORK

Recent work in human-computer interaction (HCI) has explored how AI and ML techniques can support or enhance qualitative analysis methods. For instance, Dai et al. [22] developed LLM-enhanced qualitative methods, while Lennon et al. [46] introduced AQUA, an automated analysis assistant. CollabCoder [30] and Xiao et al. [66] explored LLMs for *codebook* thematic analysis, focusing on coding

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Table 1: Overview of Agency Types as Defined by Eichner [26], detailing Individual, Creative, and Collective Dimensions and their key characteristics in media interaction.

Type of Agency	Description
Personal Agency	Focused on individual actions, perceptions, and decisions.
Mastering of Narrative	Recognizing the genre and predicting outcomes based on narrative cues.
Mastering of Choice	Exercising one’s capabilities within defined constraints.
Mastering of Action	Perceiving one’s physical or digital actions reflected in media.
Mastering of Space	Navigating through physical or digital environments to achieve goals.
Creative Agency	Involves creating objects, content, or modifications that relate to and expand on the primary media.
Collective Agency	Built upon interactions within a community that engages collaboratively and co-creates shared meanings.

and inter-coder reliability. Chen et al. [17] examined how LLMs highlight ambiguity and enable co-construction of models.

The HCI research community has also actively applied these novel methods in practice. For instance, while social media can serve as a resource for understanding people [3], particularly in sensitive or stigmatized areas, a key challenge to its use is its scale; but AI and ML methods can be used to overcome those limitations. In exploring these applications, HCI researchers have applied ML techniques to qualitative research in sensitive topics such as addiction and recovery [32], disordered eating [51], parenting issues [3], intimate partner violence [57], support for aging parents [38], and mental health [4, 67]. However, adoption barriers persist. Jiang et al. [40] and Feuston and Brubaker [29] found that qualitative researchers remain skeptical of automation in data coding, concerned about losing control over interpretation.

To address these concerns, researchers have developed visual interfaces. Klein et al. [43] proposed visual tools for exploratory data analysis. ClioQuery [37] supports historical document exploration using natural language processing. The Computational Thematic Analysis toolkit [33, 34], CollabCoder [31], DeTAILS [60], and Scholastic [39] provide non-programmers with ML-based analysis tools. Despite these advances, a lack of agency remains a barrier to adoption. Researchers prefer delegation over full automation [29, 40, 47, 59]. Keeping humans at the center of decision-making fosters autonomy, ownership, and agency [40]. These findings motivated our exploration of personal agency to help qualitative researchers maintain control over their work.

2.1 Agency

In Bandura’s view, humans actively shape their experiences rather than merely reacting to them [6]. This active role — agency — involves intention, planning, self-regulation, and self-reflection. Similarly, agency in media interaction fosters engagement by enabling users to perform meaningful actions and see their consequences [50]. Notably, a sense of agency can arise even without executing an action; merely having the option to act can be powerful [26, 50]. Tanenbaum and Tanenbaum [62] further defines agency as a commitment to meaning, where individuals immerse themselves in narratives and trust their choices. Together, these perspectives

suggest that agency is about expressing intentions and receiving feedback from the environment.

HCI has made strides in studying agency, but debates persist on how to measure and define it [8]. Research falls into two categories: explicit agency, where users control actions and outcomes [41, 61], and implicit agency, where system behaviors subtly guide users [20, 25]. Bennett et al. [7] reviewed 30 years of research, noting a predominant focus on self-causality while overlooking trade-offs between autonomy and system guidance. In this work, we design for agency using Eichner [26]’s theoretical lens.

Eichner [26] distinguishes three levels of agency: personal, creative, and collective. Personal agency, which includes mastery of narrative, choice, action, and space, must be established before creative or collective agency can occur. Creative agency arises from producing media content (e.g., creating MODS for video games [62]), while collective agency develops through forming communities (e.g., Comic Con). In this work, we focus on the four dimensions of *personal agency*:

- **Mastering action:** Users experience agency when their physical movements are reflected in the media [50]. For example, in *A Ceremony of Innocence*, mouse movements extend the user’s actions into the game [9]. A responsive mouse cursor in other contexts can evoke a similar sense of agency.
- **Mastering choice:** Agency is perceived when users recognize that they can make decisions within their environment [26]. This perception is strongest when clear rules constrain the environment; excessive freedom may instead lead users to ground their agency in a commitment to meaning [62].
- **Mastering narrative:** When users identify the genre of the media and can predict its unfolding, they derive satisfaction from a narrative that meets their expectations [26]. For instance, a line graph may guide the reader through data more effectively than the same data in a table [65].
- **Mastering space:** Agency is also felt when users navigate through a media space [50]. Effective navigation depends

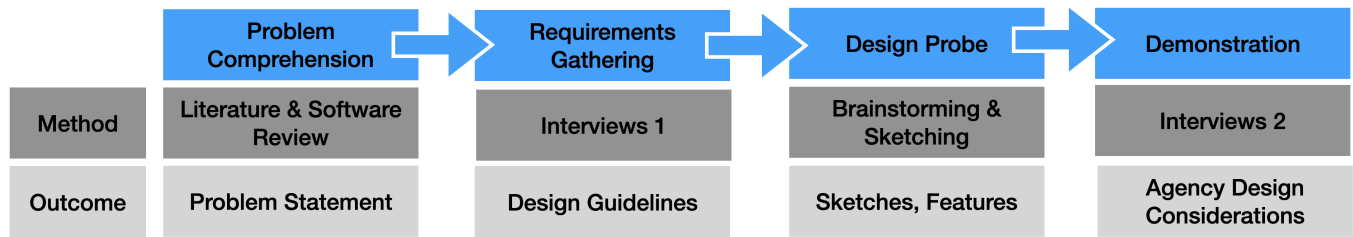


Figure 1: Our Design Science Research process followed a series of four phases: 1) Problem Comprehension, 2) Requirements Gathering, 3) Creation of a design probe, and 4) Demonstration and evaluation.

on familiarity with the media. If a zoom function, for example, does not work as expected, the resulting frustration diminishes the sense of agency [9, 65].

As discussed above, qualitative researchers have noted diminished agency when using ML tools [29, 40]. Building on these observations – and informed by foundational work on human agency [6, 26] – we employ personal agency as a design lens for this work [44]. By emphasizing dimensions such as choice, action, narrative, and space [26, 50] and recognizing the value of co-creation in data visualization [55, 62], our approach seeks to ensure that computational methods complement rather than supplant human interpretation.

3 OVERVIEW OF RESEARCH PROCESS

Design Science Research [1, 48, 58] is an iterative approach that generates knowledge through the creation and evaluation of artifacts designed to address a specific problem. It shares parallels with HCI traditions such as Research Through Design [68], in that both approaches produce knowledge via artifact construction and iterative refinement [58, 68]. Design science has been adopted within HCI and related design-oriented computing research to structure artifact development and generate transferable design knowledge through systematic evaluation (e.g., [2, 28, 53]). We adopt design science in particular because our goal is not only to explore a design space, but to articulate and evaluate transferable design commitments derived from theory and grounded in empirical inquiry. Design science provides a structured framework for translating conceptual constructs – in this case, personal agency – into operational design principles and reflecting on their validity through artifact-based evaluation.

Our use of design science comprises four phases (Figure 1): 1) problem comprehension, 2) requirements gathering, 3) creation of a design probe, and 4) demonstration and evaluation of the probe. The cyclical nature of the method allows researchers to refine their understanding of the problem and adjust requirements as the solution evolves. We first deepened our understanding of the problem through a literature review and analysis of similar software using close reading techniques [10, 11, 27]. We then gathered user needs and requirements via semi-structured interviews with qualitative researchers. Insights from these phases informed guidelines for our design probe, which we subsequently shared with participants to examine how its interaction structure shaped their sense of agency. Together, these phases constitute an iterative, generative process

Table 2: Summary of participants’ experience with qualitative research and data visualization.

Participant	Field of Study	Qualitative Exp.	Datavis Exp.
1	Vision Science	New	Moderate
2	Social Media	High	Moderate
3	Technology	High	High
4	Gerontology	Moderate	Low
5	Aging	Moderate	Low

through which we examine how agency mediates human–AI interaction in qualitative analysis contexts.

Our research protocol was approved by the University of Waterloo’s Office of Research Ethics (ORE #45268).

4 REQUIREMENTS GATHERING

We conducted semi-structured interviews to assess qualitative researchers’ needs for a data analysis tool, focusing on three aspects of data visualization interaction: 1) how visual elements support data analysis, 2) which visual elements are most important, and 3) how researchers perceive their sense of agency during research. To meet these objectives, we aimed to understand user and task requirements [48]. Participants were recruited through purposive and snowball sampling to maximize information power [49]. Data collection and analysis were carried out by experienced researchers to ensure in-depth insights.

4.1 Recruitment Criteria

We recruited a total of five (5) qualitative researchers through snowball sampling at our local institution. All were in the field of health-care, but had varied specialties, and different levels of qualitative research experience and experience with data visualizations. All participants had limited to no experience with programming, but different levels of interest and experience in using AI for their data analysis.

4.2 Interview protocol

The interview protocol consisted of eight open-ended questions which prompted participants to describe their process for conducting data analysis, the types of data visualization they are familiar with, and what software (if any) they use. We collected sketches of participants’ ideal data visualization tool, as well as examples

of how they use data visualizations as cognitive assistance during their own data analysis process.

4.3 Data Analysis

We used reflective thematic analysis [14, 18] to examine how participants described their experiences with qualitative data visualization and computational support. Our analysis was deductively oriented using Eichner's conceptualization of personal agency as a sensitizing framework, while remaining open to themes grounded in participants' accounts.

Audio-recorded interviews were transcribed using Microsoft Teams and Microsoft Word and imported into NVivo for analysis. The primary researcher conducted an initial phase of familiarization, reading transcripts multiple times and generating preliminary codes related to perceived autonomy, delegation, trust, visualization use, and narrative construction. Examples of early codes included *loss of control in automation*, *difficulty interpreting system output*, *use of sketches for sensemaking*, *need for visual guidance*, and *desire for editable representations*. These codes were iteratively grouped into broader themes reflecting recurring agency-related breakdowns, including concerns about trust in system-supported analysis, delegation of analytic tasks, and limited support for informed visualization choice.

A secondary coder reviewed the preliminary coding structure and thematic groupings to further refine them. Following this review, the primary researcher conducted a second pass through the transcripts to ensure consistency and coherence of the final themes. This iterative process strengthened the alignment between empirical observations and the four dimensions of agency that informed the subsequent design commitments.

4.4 Results

Data visualizations were used by all participants as part of their qualitative research practice, supporting sensemaking, organization, and communication. Participants described using informal sketches and visual representations—such as grouping diagrams and mind maps—to think through themes, surface relationships, and iteratively construct meaning (Figure 2). These practices provided an empirical grounding for understanding how visualization supports qualitative analysis and where existing tools introduce agency-related breakdowns.

Participants described two primary uses of visualization: supporting their own sensemaking and cognition, and communicating analytic outcomes to others. Often, a single visualization served both purposes. For example, Participant 5 described using visualizations to organize ideas while simultaneously searching for an emergent narrative, stating, “I try to make a story, like there should be, like a theme that makes sense.” As tools for knowledge translation, participants also emphasized visualization's role in presenting findings to collaborators or stakeholders. Participant 3 described this as “the story in action,” where visualizations must communicate meaning clearly enough to prompt understanding and decision-making.

Across these practices, participants articulated points where existing qualitative analysis tools constrained their sense of control, understanding, or authorship. In reflecting on computational

support for thematic analysis, three recurring agency-related breakdowns emerged: trust in system-supported analysis, delegation of analytic tasks, and guidance in selecting and using visualizations. These breakdowns motivated the agency-driven design commitments introduced in the following section.

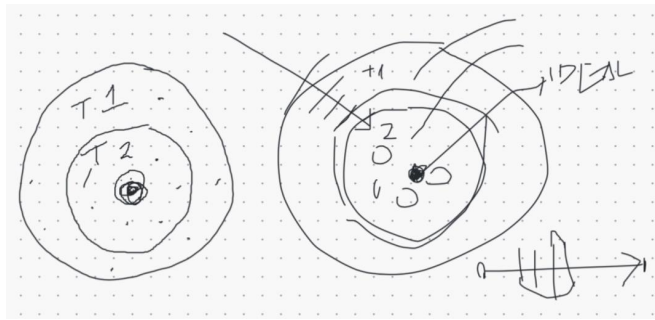
4.4.1 Trust. Participants' discussions of trust revealed agency breakdowns when computational tools obscured interpretive context or automated analytic decisions. All participants expressed skepticism toward systems that appeared to analyze data independently of human judgment, often associating such automation with loss of autonomy or authorship. As Participant 4 stated, “I wouldn't want it to analyze anything for me because then I become obsolete,” articulating a fear not simply of technical error, but of displacement from the interpretive process itself.

Several participants emphasized that qualitative analysis depends on immersion in data and sensitivity to context. Participant 1 described automatic coding in NVIVO as “very, very bizarre,” questioning whether a system could meaningfully interpret nuanced qualitative data. Participant 3 similarly argued that machines lack the ability to “read between the lines,” noting that context-heavy analysis still requires sustained manual engagement. These accounts suggest that trust is not primarily a matter of output accuracy, but of preserving mastery of action and narrative: participants were concerned that opaque automation distances them from the interpretive labour through which meaning is constructed. When analytic processes become invisible or non-interrogable, researchers experience a diminished sense of authorship over their findings.

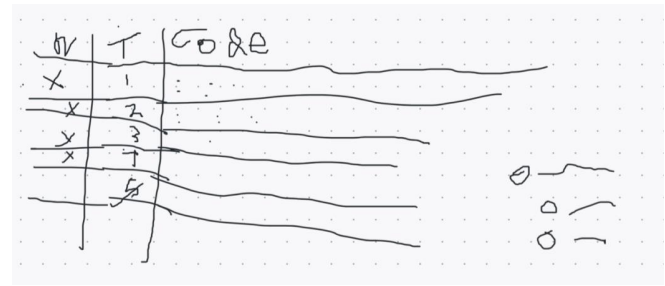
4.4.2 Delegation. While participants were reluctant to fully automate qualitative analysis, most were open to delegating limited or well-defined tasks. Participant 1 described appreciating machine assistance for counting, frequency checking, and generating visualization suggestions, while retaining authority over interpretation. Participant 3 similarly viewed computational support as a way to engage with larger datasets—particularly social media data—without displacing the human analyst. In these cases, delegation was acceptable when it functioned as operational support rather than interpretive substitution.

At the same time, two participants expressed resistance to delegation altogether. Participant 5 characterized qualitative research as something that should remain “in the hands of humans,” expressing concern that machine involvement could erode empathy and personal connection to the data. Participant 4 described a perceived loss of agency if a system appeared to be “doing her work for her.” These responses suggest that delegation becomes problematic when systems assume interpretive authority rather than supporting mastery of action. Participants were willing to offload repetitive operations, but strongly resisted tools that appeared to appropriate meaning-making or final judgment.

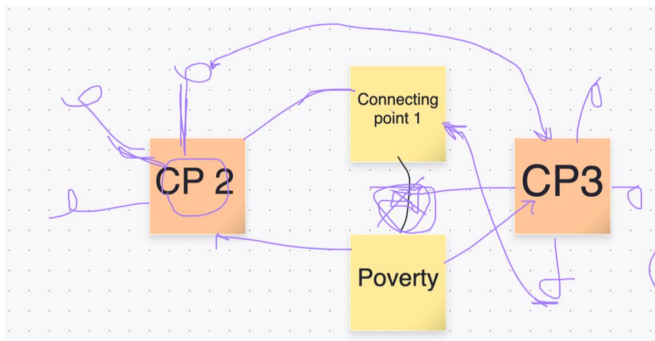
4.4.3 Guidance. Participants also described agency breakdowns related to limited guidance when selecting and using data visualizations. Although all regularly used visual representations in their analytic practice, several articulated a gap between conceptual intent and operational ability. Participant 5 noted feeling “restricted” by familiar diagram types, expressing surprise when exposed to



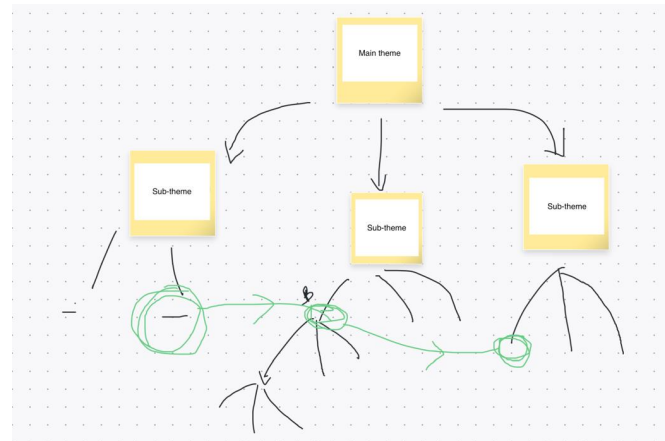
(1) A grouping plot by Participant 1



(2) A grouping plot by Participant 2



(3) A mind map from Participant 4



(4) A mind map from Participant 5

Figure 2: Participant sketches captured during interviews. Participants used grouping diagrams (1,2) and mind maps (3,4) to organize themes, surface relationships, and construct analytic narratives.

new possibilities: “Now that you’re showing me so many types of visualization, I’m like oh damn! Does that even exist?” Rather than reflecting a lack of visualization literacy, such responses suggest that participants could articulate what they wanted to express analytically, but lacked structured support for translating those intentions into concrete visual forms.

At the same time, existing tools such as NVIVO were described as overly complex and intimidating. Participant 1 reported frustration with the platform’s interface when attempting to construct desired visualizations, while Participant 2 found its visual outputs insufficient for her needs. Conversely, excessive freedom without guidance was also experienced as disempowering: participants struggled to explore visualization options they did not know existed or understand how to apply. Participant 4 summarized her ideal tool as one that “lays those options out for me and gives me suggestions,” while preserving her ability to choose and control the analytic process. These tensions highlight that mastery of choice depends not simply on having options, but on being meaningfully scaffolded through them in ways that support narrative construction without constraining authorship.

5 DESIGN PROBE

We developed a design probe to translate observed breakdowns in personal agency into concrete interaction commitments. Rather than using agency as a post-hoc interpretive frame, we treated Eichner’s dimensions of personal agency — mastery of action, choice, narrative, and space — as generative constraints shaping the probe’s interaction model.

From our requirements gathering, we identified recurring tensions in participants’ experiences with qualitative analysis tools. Trust-related concerns reflected threats to mastery of action and narrative when automation obscured interpretive labour. Delegation tensions centered on preserving authority over meaning-making while offloading routine operations. Guidance-related breakdowns exposed limits to mastery of choice, where too little structure constrained exploration and excessive freedom produced friction. Participants also described difficulty navigating opaque or rigid interfaces, implicating mastery of space.

Rather than treating these issues as isolated usability problems, we interpret them as manifestations of disrupted personal agency. The following agency-driven design commitments therefore translate these empirical tensions into structured interaction principles

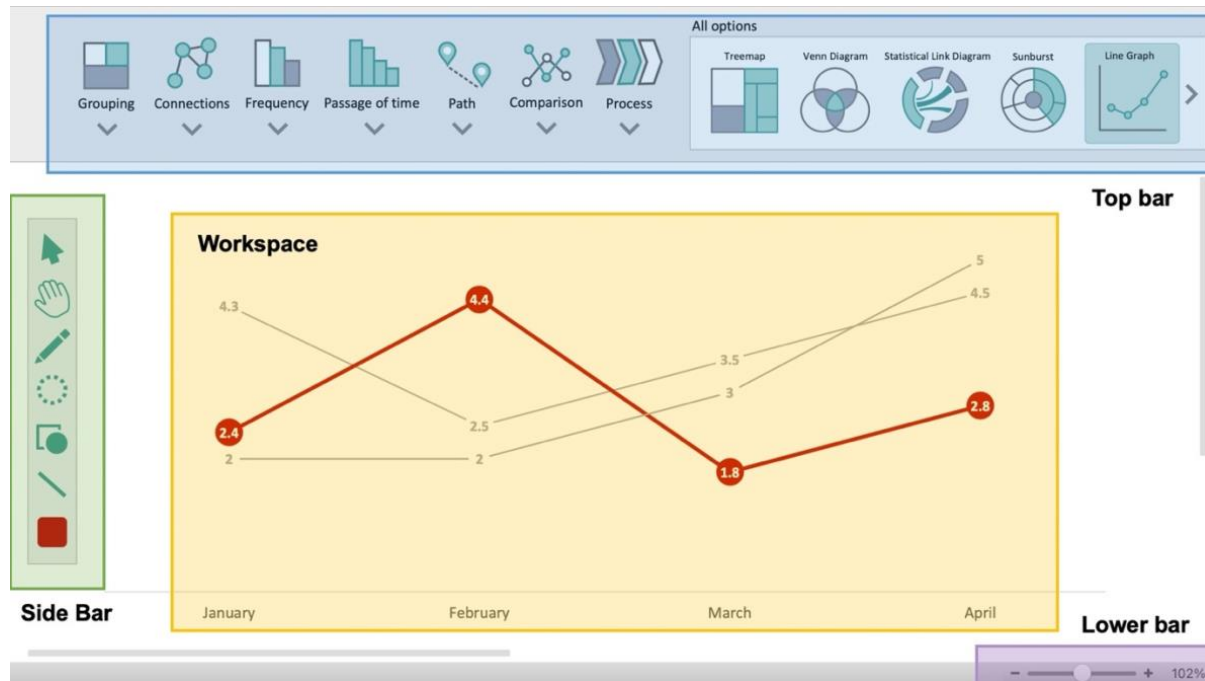


Figure 3: Design probe embodying agency-driven design commitments. The interface operationalizes mastery of action, choice, narrative, and space through task-oriented visualization categories, transparent generation, and direct manipulation. The probe was used as a concrete design argument in follow-up interviews.

intended to preserve mastery of action, choice, narrative, and space within AI-assisted qualitative analysis. We use the term design commitments to describe structured interaction principles derived from our empirical findings. Unlike feature-level decisions, these commitments articulate constraints on how the system should behave in order to preserve personal agency. They preceded the construction of the probe and served as generative guidelines for its design.

DC1: Support mastery of action through task-oriented visualization choices. Participants reported loss of agency when tools imposed fixed workflows or automated decisions. To preserve mastery of action, the probe organizes visualizations by analytic intent (e.g., exploring, grouping, comparing, tracking change) rather than by algorithmic function. This structure makes available actions legible while preserving the researcher’s authority to decide which action to take and when.

DC2: Support mastery of choice through guided awareness of visualization possibilities. Participants described limited visualization literacy and uncertainty about which visual forms could support their goals. The probe foregrounds available visualization options within each analytic category, providing guidance without prescribing outcomes. This supports informed choice by expanding awareness while maintaining autonomy over selection.

DC3: Support mastery of narrative through editable, researcher-controlled representations. Participants emphasized the importance of shaping visualizations to align with their interpretive narratives. The probe therefore prioritizes direct editing—such as rearranging, recoloring, and refining visual elements—allowing

researchers to iteratively construct and revise representations that reflect their analytic story.

DC4: Preserve agency through transparent delegation and user verification. Participants were reluctant to delegate interpretive work to opaque systems. All computer-supported operations in the probe are therefore designed to be inspectable and reversible, ensuring that researchers retain the final say over analytic outcomes. This transparency reinforces agency through choice by enabling users to accept, modify, or reject system-generated suggestions.

These commitments are embodied in the design probe shown in Figure 3. The interface consists of three regions: a central canvas for creating and manipulating visualizations, a top bar for selecting visualization actions organized by analytic intent, and a side panel offering editing controls. The layout draws on familiar interaction patterns from tools such as PowerPoint and NVIVO—both cited by participants—leveraging users’ existing mastery of space to reduce friction and support exploratory movement within the analytic workspace.

The probe is not intended as a functional system but as a concrete instantiation of agency-driven design decisions. In follow-up interviews, it served as a shared reference point for discussing how alternative interaction structures might better support researchers’ sense of control, interpretation, and engagement when working with qualitative data.

5.1 Design Probe as an Agency Intervention

Following the initial requirements interviews, we conducted a second round of sessions with the same five participants to examine their responses to the design probe. Each session lasted approximately 30 minutes and was conducted over Zoom. Participants were introduced to the probe's intended functionality for supporting thematic analysis and were guided through its interface using a screen-shared walkthrough. They were encouraged to think aloud while interacting with the probe and to reflect on how its interaction structure aligned with their sense of control, interpretation, and authorship during qualitative analysis.

Rather than evaluating usability or feature completeness, these sessions focused on participants' perceptions of agency in relation to the probe's design commitments. Participants were invited to annotate screenshots using a shared Zoom whiteboard and to suggest modifications or alternative interaction structures. All sessions were audio-recorded and transcribed.

We analyzed the feedback using the same reflective thematic analysis approach described in Section 4.3, focusing specifically on how participants described autonomy, delegation, transparency, and visualization guidance when engaging with the probe. This analysis allowed us to examine whether the operationalized design commitments meaningfully addressed the agency-related breakdowns identified in the initial interviews.

Overall, participants described the semi-automated data visualization process as promising for enhancing their research workflows. In particular, they emphasized two aspects that shaped their response to the probe: perceived autonomy in shaping representations, and the need for guidance in selecting and understanding visualization options.

5.2 Validating Agency-Preserving Delegation

Participants' responses reflected cautious optimism toward the probe's interaction structure. While several participants described the semi-automated visualization process as potentially supportive of their workflow, their feedback centred on two recurring concerns: the preservation of autonomy in shaping representations, and the degree of guidance provided for selecting and understanding visualization options. These reflections allowed us to examine how the probe's design commitments were interpreted in practice, rather than treating the sessions as a confirmation of effectiveness.

Participant 3 explained that working with computational tools often feels opaque, particularly when the process behind an unsatisfactory result is hidden. She noted that without an understanding of how outcomes are generated, users lack clear avenues for correction. In response to the probe, she suggested adding features that explain how system-supported operations arrived at particular results, enabling users to reason about and refine those outcomes. Importantly, this feedback reflects a desire for actionable transparency rather than full automation or manual control.

Other participants emphasized the importance of verifying system outputs through clear, detailed feedback. Participant 5 likened this process to "checking back math," describing how the probe supported oversight by allowing her to review intermediate results before accepting them. Participant 2 reinforced this need, stating, "I think that would make a lot of sense as long as it's detailed enough."

Together, these responses indicate that transparency must support not only explanation, but also intervention.

Participants also valued a balance between delegation and autonomy. Participants 1, 3, 4, and 5 expressed appreciation for the probe's predefined categories, which guided analytic actions without constraining decision-making. Participant 1 noted that having structured options encouraged deeper engagement with the data while preserving her role as the primary decision-maker. Collectively, this feedback supports a design approach in which delegation is framed as a reversible, inspectable collaboration—one that enables researchers to offload routine operations while retaining interpretive authority over the analytic process.

5.3 Scaffolding Visualization Choice Without Reducing Agency

Participants' feedback suggests that the design commitment to scaffold visualization selection aligned with their concerns about agency. Rather than indicating a lack of visualization literacy, participants' responses revealed a gap between conceptual intent and operational ability: many could articulate what they wanted to express analytically, but lacked the vocabulary or technical means to translate those intentions into concrete visual forms.

Participant 3 explained that she often knows what kind of visualization she wants to use, but lacks the technical knowledge to create it. Similarly, Participant 4 noted that a tool alleviating the burden of starting from a blank canvas—by offering predefined categories to guide selection—would be particularly useful. Reflecting on the probe, Participant 5 remarked, "a tool like this probably would have made the connections seem easier... which would have probably made my life easier," emphasizing the role of structured guidance in supporting analytic sensemaking.

Participants consistently valued pre-prepared options paired with intuitive guidance. During the feedback session, Participant 5 navigated the probe's categories to transform a mind map into a group-linking diagram, making relationships between concepts more explicit. Initially frustrated—"Honestly, I don't know how to draw that out"—she later reflected that the structured options helped generate new analytic connections, noting that they "give you ideas because you can actually build connections between two variables in your research more effectively." This episode illustrates how scaffolding reduced operational friction while preserving authorship, enabling mastery of choice without constraining interpretive direction.

Overall, these responses indicate that structured guidance can expand analytic possibilities without diminishing agency. By presenting visualization choices in a structured yet flexible manner, the probe appeared to support mastery of choice and narrative: participants retained control over what to create and how to interpret it, while benefiting from guidance that surfaced new analytic directions.

6 RESULTS

Our analysis examines how participants responded to the design probe as a concrete instantiation of our agency-driven design commitments. Rather than introducing new requirements, we focus on whether and how the probe supported qualitative researchers'

mastery of *action*, *choice*, *narrative*, and *space* when working with qualitative data. Participant feedback is therefore interpreted as validation of specific design decisions, revealing how structured guidance, transparent delegation, and direct manipulation can preserve personal agency while supporting interactions with computational and AI-assisted analysis tools.

6.1 Mastery of Action

Participants emphasized that maintaining control over verification, decision-making, and iterative editing — supported by transparent AI explanations and guided visualization tools — was essential for preserving their sense of agency when delegating actions to machines. While they were open to delegating repetitive tasks, such as counting or checking for simple themes, they firmly resisted full automation. They viewed interpretation and verification as essential human responsibilities, consistent with prior work on task delegation [47].

Trust emerged as a central concern. Participants expressed two kinds of mistrust: doubts about AI producing consistently useful results, and fears that overly competent systems might replace human experts. Transparency helped mitigate these concerns. Participant 5 described the review process as “checking back math,” while Participant 4 stated, “I want to remain the primary decision-maker.” Participant 2 further emphasized, “I think that would make a lot of sense as long as it’s detailed enough,” highlighting the need for clear, user-friendly explanations.

Transparent communication about AI reasoning was seen as essential for both trust and agency. When researchers understood how the AI reached its conclusions, they could better assess whether those results aligned with their research goals. As noted by Lubars and Tan [47], “effective communication about automation is key to aligning the tool with researchers’ personal goals and fostering trust.” Participants noted that a lack of transparency hindered their ability to interpret results because the AI’s context and reasoning were not clear. When researchers do not understand how the AI reaches its conclusions, they feel less confident in making informed choices, ultimately reducing their perceived agency.

Participants also valued interface features that reinforced agency. Structured data visualization categories functioned as cognitive assistants, helping researchers organize, explore, and iterate on their data while retaining control. This approach is supported by prior research showing that guided visualizations enhance efficiency and insight [13, 15, 26, 42]. Real-time editing tools further allowed researchers to modify outputs on the fly, ensuring they remained in charge of the final product [55, 62]. Iterative editing, as emphasized in [26, 50, 55], kept the human element central to the research process.

6.2 Mastery of Choice

Consistent with prior research [29, 40, 47], our participants were open to using machines as assistants but rejected full automation, emphasizing that they did not want their choices taken away. They appreciated that the tool offered *suggested* outcomes while leaving the final decision to them, which improved their sense of autonomy and reassuring researchers that the tool would support rather than supplant their expertise.

Positive elements that fostered agency included features that enabled free choice, such as the editing tools and data visualization categories. Participants consistently mentioned that the ability to select the visualization that best suited their goals was a major advantage. In particular, Participant 1 and Participant 4 voiced that they preferred tools that quickly reflected their changes, allowing them to explore options and immediately assess the impact of their choices. These aspects support the idea that visible and immediate effects of choices contribute to a strong sense of agency [50].

Barriers to choice were equally apparent when the system restricted user input. During the sample analysis, some software failed to allow users to create new codes or edit visualizations, which directly contradicted the desires expressed by Participant 1 and Participant 2. Both participants indicated that they enjoyed working with AI most when it provided suggestions while allowing them the option to accept or reject these recommendations [26]. Moreover, although participants valued the freedom of choice, they also stressed the need for guidance. Participant 1 explained, “I prefer software that gives me guidance rather than one with complete freedom but no assistance,” illustrating that a balance between support and freedom is essential for fostering agency through choice.

6.3 Mastery of Narrative

Mastery of narrative refers not only to recognizing the genre of a media form and anticipating its unfolding [26], but also to aligning representational structure with interpretive intent. Visualizations are not neutral displays of information; they encode narrative expectations through form, layout, and convention. Line graphs imply temporal progression, clustering diagrams suggest relational proximity, and hierarchical trees foreground structure. When researchers recognize and appropriate these genres, they can anticipate how meaning will be organized and conveyed.

In our interviews, participants described visualizations as tools for “making a story” from their data and for communicating that story to others. Participant 3 emphasized that visualizations must convey information in a way that prompts understanding and action. These accounts suggest that mastery of narrative in qualitative analysis involves structuring representations so that analytic relationships become legible and coherent. Prior work demonstrates that visual media can shape interpretation and emotional engagement [13, 19, 36]; here, participants positioned visualization as a medium through which analytic narratives are both discovered and expressed.

Narrative agency was most evident when participants could iteratively shape representations to match their evolving interpretation. The design probe supported this through editable and manipulable visual forms, allowing researchers to rearrange, recolor, and refine elements as their analytic story developed [45, 55]. This process reflects a commitment to meaning [62]: narrative coherence emerged through active construction rather than passive reception. When researchers could modify representations in real time, they retained authorship over how themes were connected and how analytic trajectories unfolded.

Participants also described allowing the data to “lead” the storytelling process. Rather than imposing a predetermined narrative, they used visualization to surface patterns and relationships

that informed subsequent interpretation. Representations that foregrounded connections—such as grouping diagrams and relational maps—were experienced as particularly supportive, as they made thematic threads visible and traceable. In these moments, mastery of narrative was not about predicting a fixed outcome, but about maintaining alignment between representational genre and interpretive direction. When visualization structure supported this alignment, participants reported greater coherence and confidence in their analytic storytelling [26].

6.4 Mastery of Space

Overall, participants enjoyed using data visualizations for data analysis because the act of visualizing information simplified cognitive processes. However, they emphasized that a key aspect of effective visualization is the freedom to move and interact within the digital space. This flexibility is crucial for maintaining a sense of agency, as users need to manipulate visual elements in a manner that mirrors their natural thought process.

Participants expressed clear frustration with tools that featured complicated navigation systems. They noted that the less intuitive the digital space, the less agency is fostered [9, 50]. For example, Participant 4 mentioned preferring whiteboards, paper, or her iPad when organizing her thoughts, as these mediums offered the freedom to be "messy" and move elements freely. Similarly, Participants 2 and 3 described physically moving elements as a positive aspect that enhanced their research experience by fostering mastery of space.

The sample analysis reinforced these insights, revealing that software enabling easy movement supports user agency. NVIVO, for instance, allowed users to click on and reposition elements freely—a feature that Participant 4 appreciated as it mimicked her preferred data exploration method. In contrast, Participant 3 expressed frustration with word files that lacked features to facilitate movement, highlighting how restrictions in navigating digital space can hinder perceptions of agency.

Guidance emerged as another critical factor in effective navigation. Although tools like NVIVO offered additional options, these features were often hidden under right-click menus, making navigation confusing and frustrating [26, 50]. Participant 3 reported similar difficulties with the CTA [34], noting that a lack of guidance impeded her ability to navigate the software efficiently. Conversely, elements such as colour-coding and clustering were praised; Participant 4 observed that colours helped organize data mentally, and participants appreciated the clear separation of sections in the design probe, which facilitated intuitive navigation and reinforced their sense of agency.

7 DISCUSSION

This study demonstrates that fostering personal agency through interactive visualizations, transparent use of AI, and user-driven editing tools can empower qualitative researchers and build trust. Building on these insights, we identify three key implications for HCI research that not only address current challenges in qualitative data analysis but also pave the way for future innovations in user-centred design.

7.1 Agency as Design Lens

Human-computer interaction research has long sought to understand how to engage and motivate users [7]. Self-Determination Theory (SDT) [23] is a well-established framework in HCI (e.g., [5, 63]) that emphasizes autonomy, competence, and relatedness as core drivers of motivation. Tyack and Mekler [63, 64] call for deeper engagement with SDT in interface design, noting that its constructs are often invoked at a high level but less frequently translated into concrete interaction structures.

While SDT's notion of *autonomy* centres on acting with self-endorsement and volition, *personal agency* emphasizes the capacity to act within and shape a mediated environment. These constructs are related but not interchangeable. Autonomy concerns independence of choice; agency concerns how systems structure action, narrative construction, and movement within representational space. For designers working with AI-supported tools, this distinction is consequential: preserving autonomy alone does not ensure that users retain meaningful authorship over interpretive processes.

Recent work in AI-assisted systems frequently emphasizes transparency, explainability, and human-in-the-loop oversight. While these constructs are important, they address only part of the interactional problem. Transparency clarifies how a system arrived at a result; explainability renders internal processes legible; human-in-the-loop models preserve final decision authority. However, a system may be fully transparent yet still constrain how users act, reorganize representations, or construct analytic narratives. Agency shifts the focus from disclosure of system logic to the structuring of action within the interface. In this sense, transparency is a component of agency, but not its equivalent.

A central challenge in adopting SDT for design is its level of abstraction. Although autonomy, competence, and relatedness are theoretically robust, they do not readily specify how interfaces should be structured. By situating transparency and delegation within a structured model of personal agency—mastery of action, choice, narrative, and space—we translate motivational theory into operational design commitments. Rather than treating transparency as an isolated requirement, we examine how opaque delegation disrupts mastery of action and narrative, and how structured scaffolding can expand mastery of choice without diminishing authorship. This reframing offers a generative framework that connects theory to concrete interaction design.

The design probe illustrates how these commitments can be instantiated. Task-oriented visualization categories supported mastery of action and choice by making analytic possibilities legible without prescribing outcomes. Editable representations enabled mastery of narrative by allowing researchers to iteratively construct and revise their analytic story. Transparent and reversible system operations preserved agency during delegation by ensuring that interpretive authority remained with the researcher. These features do not eliminate the tensions inherent in AI-assisted analysis, but suggest that interaction structure plays a critical role in shaping how those tensions are experienced.

Although our focus here is on personal agency, related constructs such as creative and collective agency warrant further exploration. Collective agency, for example, may intersect productively with SDT's relatedness construct in collaborative qualitative analysis

contexts. Future work should examine how these dimensions operate in fully implemented systems and across broader research communities.

7.2 Interacting with AI via Information Visualization

Participants uniformly stressed that, lacking coding skills, they could not meaningfully intervene in AI-generated results without a graphical interface that exposes underlying processes. This unmet need undermined their sense of control and discouraged adoption of automated methods, consistent with findings from Jiang et al. [40] and Feuston and Brubaker [29]. Echoing Lubars and Tan [47], participants emphasized that understanding “how the AI reached this result” was essential before accepting anything beyond trivial operations. However, their concerns extended beyond explanation alone. Transparency was valued not simply as disclosure, but as a precondition for intervention: participants wanted to see, manipulate, and reshape intermediate representations rather than passively receive outputs.

From the perspective of personal agency, this distinction is critical. An explanation of model reasoning may clarify how a result was produced, but it does not necessarily restore mastery of action or narrative. Agency depends on whether users can act within the representational space—reorganizing elements, reframing clusters, or redirecting analytic trajectories. Visualization provides such a space. As demonstrated in prior work on digital media genres, representational forms structure expectation and interpretation; they signal how meaning unfolds and what kinds of action are possible. When AI interaction occurs solely through chat-based prompts, analytic structure remains largely implicit. By contrast, information visualization externalizes analytic structure, making it inspectable and negotiable.

In response, our design probe emphasizes personal agency through a familiar visual genre. By adopting a PowerPoint-like interface, we leverage users’ existing genre expectations to scaffold interaction and reduce cognitive friction. The probe presents a curated set of visualization actions—such as drag-and-drop clustering and color-coded editing—allowing researchers to iteratively construct and revise representations while preserving interpretive authority. This design supports mastery of space by enabling free movement and regrouping, mastery of action by making analytic operations legible, and mastery of narrative by allowing representations to evolve alongside interpretation.

Participants contrasted the probe’s immediate drag-and-drop and color-coding controls with NVivo’s layered menus, which they described as obscuring available actions. These reactions suggest that interaction structure—rather than explanation alone—shapes whether AI systems are experienced as collaborative or constraining. Accordingly, we argue that moving beyond free-form chat interfaces toward structured, visualization-driven workflows may better support agency in qualitative analysis. Just as graphical user interfaces replaced command-line interaction by making operations visible and manipulable, AI tools may benefit from operational metaphors that render analytic processes inspectable and revisable [12, 16].

7.3 Design Process as Intervention

Our study revealed that participant perceptions of AI evolved significantly during the research process. Initially, three participants expressed reluctance to work with AI. However, after engaging in the co-design session, they became much more open to the idea of AI delegation. This shift demonstrates how collaborative design can help skeptical or hesitant qualitative researchers see AI as an assistant rather than a replacement.

The co-design process acted as an effective intervention that increased participants’ openness to integrating AI into their research. By actively contributing to the design probe’s development, users became familiar with the concept of working alongside AI. This hands-on experience reassured them that the tool was meant to support their work, not supplant their role in the research process.

Our findings align with previous research [29, 40], which shows that qualitative researchers are open to AI assistance as long as they can understand and control how tasks are delegated. Through participation in the design process, participants not only learned the role of AI in their work but also built trust in the system [47]. This collaborative approach demystifies AI processes and reinforces user agency.

Looking forward, designing with qualitative researchers is crucial for developing effective research tools. This approach not only produces tools that users are comfortable with but also builds lasting trust between researchers and the technology they use. The iterative method of Design Science Research (DSR) should be further explored in HCI, serving both as a means of artifact creation and as an intervention to increase user comfort with technological innovations.

7.4 Limitations

Our study involved five qualitative researchers from a single institutional context within the health domain. While this sample size aligns with information power principles in qualitative inquiry—where depth and domain expertise are prioritized over breadth—it limits the diversity of analytic traditions represented. Participants shared disciplinary norms and exposure to similar tool ecosystems, which may have shaped their expectations of AI-assisted analysis. Accordingly, our findings should be interpreted as design knowledge grounded in a specific research community rather than as claims about qualitative researchers broadly. Future work should examine how agency-driven design commitments translate across disciplinary contexts, analytic paradigms, and levels of technical expertise.

8 CONCLUSION

In this work, we examined how framing qualitative analysis tools through the four dimensions of personal agency—action, choice, narrative, and space—can inform the design of AI-augmented interfaces. Through engagement with qualitative researchers, we identified recurring tensions related to transparency, delegation, and visualization guidance, and translated these into structured design commitments embodied in a lightweight probe. Feedback from practising qualitative researchers suggests that partial delegation of routine tasks paired with verification mechanisms may preserve agency; that transparent system behaviour can support

trust; and that structured yet editable visualization categories can guide exploration without diminishing authorship.

Taken together, these findings indicate that personal agency offers a productive lens for reasoning about human-AI collaboration in qualitative research. Rather than treating transparency or explainability as isolated features, our approach situates them within a broader model of mastery over action, choice, narrative, and space. While the probe was exploratory and not a fully implemented system, participants' responses point toward interaction structures that may better preserve researcher control in AI-assisted analysis.

Future work should extend this approach by implementing and evaluating a full prototype in real-world research settings, examining long-term impacts on analytic practice, and exploring related constructs such as creative and collective agency. We suggest that personal agency provides a generative framework for designing AI tools that aim to support—rather than supplant—human judgment in qualitative inquiry.

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REFERENCES

- Marc TP Adam, Shirley Gregor, Alan Hevner, and Stefan Morana. 2021. Design science research modes in human-computer interaction projects. *AIS Transactions on Human-Computer Interaction* 13, 1 (2021), 1–11.
- Sisira Adikari, Craig McDonald, and Penny Collings. 2006. A design science approach to an HCI research project. In *Proceedings of the 18th Australia Conference on Computer-Human Interaction: Design: Activities, Artefacts and Environments* (Sydney, Australia) (OZCHI '06). Association for Computing Machinery, New York, NY, USA, 429–432. <https://doi.org/10.1145/1228175.1228265>
- Tawfiq Ammari, Sarita Schoenebeck, and Daniel M. Romero. 2018. Pseudonymous Parents: Comparing Parenting Roles and Identities on the Mommit and Daddit Subreddits. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada.) (CHI '18). Association for Computing Machinery, New York, NY, USA, 1–13. <https://doi.org/10.1145/3173574.3174063>
- Nazamin Andalibi, Oliver L. Haimson, Munmun De Choudhury, and Andrea Forte. 2016. Understanding Social Media Disclosures of Sexual Abuse Through the Lenses of Support Seeking and Anonymity. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (San Jose, California, USA) (CHI '16). Association for Computing Machinery, New York, NY, USA, 3906–3918. <https://doi.org/10.1145/2858036.2858096>
- Nick Ballou, Sebastian Deterding, April Tyack, Elisa D Mekler, Rafael A Calvo, Dorian Peters, Gabriela Villalobos-Zúñiga, and Selen Turkay. 2022. Self-Determination Theory in HCI: Shaping a Research Agenda. In *Extended Abstracts of the 2022 CHI Conference on Human Factors in Computing Systems* (New Orleans, LA, USA) (CHI EA '22). Association for Computing Machinery, New York, NY, USA, Article 113, 6 pages. <https://doi.org/10.1145/3491101.3503702>
- Albert Bandura. 2006. Toward a psychology of human agency. *Perspectives on psychological science* 1, 2 (2006), 164–180.
- Dan Bennett, Oussama Metatla, Anne Roudaut, and Elisa D. Mekler. 2023. How does HCI Understand Human Agency and Autonomy?. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (Hamburg, Germany) (CHI '23). Association for Computing Machinery, New York, NY, USA, Article 375, 18 pages. <https://doi.org/10.1145/3544548.3580651>
- Joanna Bergström, Jarrod Knibbe, Henning Pohl, and Kasper Hornbæk. 2022. Sense of Agency and User Experience: Is There a Link? *ACM Trans. Comput.-Hum. Interact.* 29, 4, Article 28 (March 2022), 22 pages. <https://doi.org/10.1145/3490493>
- Jim Bizzocchi. 2003. Ceremony of Innocence and the Subversion of Interface: Cursor Transformation as a Narrative Device. *MelbourneDAC, the 5th International Digital Arts and Culture Conference* (2003). <http://hypertext.rmit.edu.au/dac/papers/Bizzocchi.pdf>
- Jim Bizzocchi. 2005. Run, Lola, Run-Film as Narrative Database. In *Conference conducted at the 4th Media In Transition Conference of the Massachusetts Institute of Technology, Massachusetts, MA*.
- Jim Bizzocchi and Joshua Tanenbaum. 2011. Well read: Applying close reading techniques to gameplay experiences. *Well played 3.0: Video games, value and meaning* 3 (2011), 289–316.
- Alan F. Blackwell. 2006. The reification of metaphor as a design tool. *ACM Trans. Comput.-Hum. Interact.* 13, 4 (Dec. 2006), 490–530. <https://doi.org/10.1145/1188816.1188820>
- Jaqueline Vasconcelos Braga, Tiago Barros Pontes e Silva, and Virginia Tiradentes Souto. 2020. Manipulações estatísticas e anomalias visuais: design de visualização de dados e reconhecimento de vieses estatísticos. *InfoDesign - Revista Brasileira de Design da Informação* 17 (2020), 145–162. Issue 2.
- Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3 (2006), 77–101. Issue 2. <https://doi.org/10.1191/1478088706qp063oa>
- Federico Cabitza, Angela Locoro, Daniela Fogli, and Massimiliano Giacomini. 2016. Valuable visualization of healthcare information: From the quantified self data to conversations. *Proceedings of the Workshop on Advanced Visual Interfaces AVI 07-10-June-2016*, 376–380. <https://doi.org/10.1145/2909132.2927474>
- John M. Carroll and Judith Reitman Olson. 1988. Chapter 2 - Mental Models in Human-Computer Interaction. This chapter appeared in its entirety and is reprinted from *Mental Models in Human Computer Interaction: Research Issues about What the User of Software Knows*, J.M. Carroll and J.R. Olson, Editors, -The report of the workshop on software human factors: Users mental models, Nancy Anderson, chair, sponsored by the Committee on Human Factors, Commission on Behavioral and Social Sciences and Education, National Research Council, published by the National Academy Press, 1987. In *Handbook of Human-Computer Interaction*, MARTIN HELANDER (Ed.). North-Holland, Amsterdam, 45–65. <https://doi.org/10.1016/B978-0-444-70536-5.50007-5>
- Nan-Chen Chen, Margaret Drouhard, Rafal Kocielnik, Jina Suh, and Cecilia R. Aragon. 2018. Using Machine Learning to Support Qualitative Coding in Social Science: Shifting the Focus to Ambiguity. *ACM Trans. Interact. Intell. Syst.* 8, 2, Article 9 (jun 2018), 20 pages. <https://doi.org/10.1145/3185515>
- Victoria Clarke and Virginia Braun. 2017. Thematic analysis. *The journal of positive psychology* 12, 3 (2017), 297–298.
- Benjamin Cooley. 2020. Data visualization as Grief. <https://medium.com/nightingale/data-visualization-as-grief-599dc6536e6f>
- David Coyle, James Moore, Per Ola Kristensson, Paul Fletcher, and Alan Blackwell. 2012. I did that! Measuring users' experience of agency in their own actions. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Austin, Texas, USA) (CHI '12). Association for Computing Machinery, New York, NY, USA, 2025–2034. <https://doi.org/10.1145/2207676.2208350>
- John W Creswell and Cheryl N Poth. 2016. *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- Shih-Chieh Dai, Aiping Xiong, and Lun-Wei Ku. 2023. LLM-in-the-loop: Leveraging Large Language Model for Thematic Analysis. arXiv:2310.15100 [cs.CL]
- Edward L Deci and Richard M Ryan. 2012. Self-determination theory. *Handbook of theories of social psychology* 1, 20 (2012), 416–436.
- Norman K Denzin and Yvonna S Lincoln. 2011. *The Sage handbook of qualitative research*. Sage.
- Johanna K. Didon, Krzysztof Wolski, Dennis Wittchen, David Coyle, Thomas Leimkühler, and Paul Strohmeier. 2024. Who did it? How User Agency is influenced by Visual Properties of Generated Images. In *Proceedings of the 37th Annual ACM Symposium on User Interface Software and Technology* (Pittsburgh, PA, USA) (UIST '24). Association for Computing Machinery, New York, NY, USA, Article 94, 17 pages. <https://doi.org/10.1145/3654777.3676335>
- Susanne Eichner. 2014. *Agency and Media Reception Experiencing Video Games, Film, and Television* (1 ed.). Springer VS, Wiesbaden. 250 pages. <https://doi.org/10.1007/978-3-658-04673-6>
- Luciane Maria Fadel. 2020. O método close reading aplicado à análise de mídias interativas. *Universidade Federal de Santa Catarina. Florianópolis, SC* (2020).
- Daniel Fallman. 2003. Design-oriented human-computer interaction. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Ft. Lauderdale, Florida, USA) (CHI '03). Association for Computing Machinery, New York, NY, USA, 225–232. <https://doi.org/10.1145/642611.642652>
- Jessica L. Feuston and Jed R. Brubaker. 2021. Putting Tools in Their Place: The Role of Time and Perspective in Human-AI Collaboration for Qualitative Analysis. *Proceedings of the ACM on Human-Computer Interaction* 5 (10 2021). Issue CSCW2. <https://doi.org/10.1145/3479856>
- Jie Gao, Yuchen Guo, Gionnieve Lim, Tianqin Zhan, Zheng Zhang, Toby Jia-Jun Li, and Simon Tangi Perrault. 2023. CollabCoder: A GPT-Powered Workflow for Collaborative Qualitative Analysis. *arXiv preprint arXiv:2304.07366* (2023).
- Jie Gao, Yuchen Guo, Gionnieve Lim, Tianqin Zhang, Zheng Zhang, Toby Jia-Jun Li, and Simon Tangi Perrault. 2024. CollabCoder: A Lower-barrier, Rigorous Workflow for Inductive Collaborative Qualitative Analysis with Large Language Models. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) (CHI '24). Association for Computing Machinery, New York, NY, USA, Article 11, 29 pages. <https://doi.org/10.1145/3613904.3642002>
- Robert P Gauthier, Mary Jean Costello, and James R Wallace. 2022. "I Will Not Drink With You Today": A Topic-Guided Thematic Analysis of Addiction Recovery on Reddit. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (New Orleans, LA, USA) (CHI '22). Association for Computing Machinery, New York, NY, USA, Article 20, 17 pages. <https://doi.org/10.1145/>

- 3491102.3502076
- [33] Robert P. Gauthier, Catherine Pelletier, Laurie-Ann Carrier, Maude Dionne, Ève Dubé, Samantha Meyer, and James R. Wallace. 2022. Agency and Amplification: A Comparison of Manual and Computational Thematic Analyses by Public Health Researchers. *Proc. ACM Hum.-Comput. Interact.* 7, GROUP, Article 2 (dec 2022), 22 pages. <https://doi.org/10.1145/3567552>
- [34] Robert P. Gauthier and James R. Wallace. 2022. The Computational Thematic Analysis Toolkit. *Proceedings of the ACM on Human-Computer Interaction* 6. Issue GROUP. <https://doi.org/10.1145/3492844>
- [35] Josir Cardoso Gomes, Ricardo Medeiros Pimenta, and Marco Schneider. 2019. MINERAÇÃO DE DADOS NA PESQUISA EM CIÊNCIA DA INFORMAÇÃO: DESAFIOS E OPORTUNIDADES. *GT-1 – Estudos históricos e epistemológicos da Ciência da Informação*.
- [36] Jonathan Gray. 2020. The Data Epic: Visualization Practices for Narrating Life and Death at a Distance. In *Data Visualization in Society*, Martin Enghebreten and Helen Kennedy (Eds.). Amsterdam University Press, Amsterdam, 313–328. https://doi.org/10.5117/9789463722902_ch19
- [37] Abram Handler, Narges Mahyar, and Brendan O'Connor. 2022. ClioQuery: Interactive Query-Oriented Text Analytics for Comprehensive Investigation of Historical News Archives. *ACM Trans. Interact. Intell. Syst.* 12, 3, Article 22 (jul 2022), 49 pages. <https://doi.org/10.1145/3524025>
- [38] Leila Homaeian, Vanessa Duong, Keiko Katsuragawa, and James R. Wallace. 2025. Community Support for Aging in Place: A Computational Thematic Analysis of Discussions about Informal Care on Reddit. *Proc. ACM Hum.-Comput. Interact.* 9, 1, Article GROUP8 (Jan. 2025), 25 pages. <https://doi.org/10.1145/3701187>
- [39] Matt Heun Hong, Lauren A. Marsh, Jessica L. Feuston, Janet Ruppert, Jed R. Brubaker, and Danielle Albers Zsafir. 2022. Scholastic: Graphical Human-AI Collaboration for Inductive and Interpretive Text Analysis. *UIST 2022 - Proceedings of the 35th Annual ACM Symposium on User Interface Software and Technology*. <https://doi.org/10.1145/3526113.3545681>
- [40] Jialun Aaron Jiang, Kandrea Wade, Casey Fiesler, and Jed R. Brubaker. 2021. Supporting Serendipity: Opportunities and Challenges for Human-AI Collaboration in Qualitative Analysis. *Proceedings of the ACM on Human-Computer Interaction* 5 (4 2021). Issue CSCW1. <https://doi.org/10.1145/3449168>
- [41] Shunichi Kasahara, Kazuma Takada, Jun Nishida, Kazuhisa Shibata, Shinsuke Shimajo, and Pedro Lopes. 2021. Preserving Agency During Electrical Muscle Stimulation Training Speeds up Reaction Time Directly After Removing EMS. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (Yokohama, Japan) (CHI '21)*. Association for Computing Machinery, New York, NY, USA, Article 194, 9 pages. <https://doi.org/10.1145/3411764.3445147>
- [42] Helen Kennedy and Martin Enghebreten. 2020. *Data Visualization in Society*. <https://doi.org/10.5117/9789463722902>
- [43] Lauren F Klein, Jacob Eisenstein, and Iris Sun. 2015. Exploratory thematic analysis for digitized archival collections. *Digital scholarship in the humanities* 30, suppl_1 (2015), i130–i141.
- [44] Philipp Koytek, Charles Perin, Jo Vermeulen, Elisabeth André, and Sheelagh Carpendale. 2018. MyBrush: Brushing and Linking with Personal Agency. *IEEE Transactions on Visualization and Computer Graphics* 24, 1 (2018), 605–615. <https://doi.org/10.1109/TVCG.2017.2743859>
- [45] Marie laure Ryan. 2006. *Avatars of Story*. University of Minnesota Press 111 Third Avenue South, Suite 290 Minneapolis, MN 55401 -2520 <http://www.upress.umn.edu> Library.
- [46] Robert P Lennon, Robbie Fraleigh, Lauren J Van Scoy, Aparna Keshaviah, Xindi C Hu, Bethany L Snyder, Erin L Miller, William A Calo, Aleksandra E Zgierska, and Christopher Griffin. 2021. Developing and testing an automated qualitative assistant (AQUA) to support qualitative analysis. *Family Medicine and Community Health* 9, Suppl 1 (2021).
- [47] Brian Lubars and Chenhao Tan. 2019. Ask Not What AI Can Do, But What AI Should Do: Towards a Framework of Task Delegability. In *Advances in Neural Information Processing Systems 32 (NeurIPS 2019)*. 57–67. <https://proceedings.neurips.cc/paper/2019/hash/d67d8ab4f4c10bf22aa353e27879133c-Abstract.html>
- [48] Martin Maguire. 2001. Methods to support human-centred design. *International Journal of Human Computer Studies* 55 (2001), 587–634. Issue 4. <https://doi.org/10.1006/ijhc.2001.0503>
- [49] Kirsti Malterud, Volkert Dirk Siersma, and Ann Dorrit Guassora. 2016. Sample Size in Qualitative Interview Studies: Guided by Information Power. *Qualitative Health Research* 26 (11 2016), 1753–1760. Issue 13. <https://doi.org/10.1177/1049732315617444>
- [50] Janet Murray. 1997. *Immersion*. 98–122.
- [51] Fayika Farhat Nova, Amanda Coupe, Elizabeth D. Mynatt, Shion Guha, and Jessica A. Pater. 2022. Cultivating the Community: Inferring Influence within Eating Disorder Networks on Twitter. *Proc. ACM Hum.-Comput. Interact.* 6, GROUP, Article 7 (jan 2022), 33 pages. <https://doi.org/10.1145/3492826>
- [52] Michael Quinn Patton. 2014. *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.
- [53] Ken Peffers, Marcus Rothenberger, Tuure Tuunanen, and Reza Vaezi. 2012. Design science research evaluation. In *Proceedings of the 7th International Conference on Design Science Research in Information Systems: Advances in Theory and Practice (Las Vegas, NV) (DESRIST'12)*. Springer-Verlag, Berlin, Heidelberg, 398–410. https://doi.org/10.1007/978-3-642-29863-9_29
- [54] Catherine Pope, Sue Ziebland, and Nicholas Mays. 2000. Qualitative research in health care Analysing qualitative data. *BMJ* 320 (2000), 114–116. www.bmj.com
- [55] Jacob D. Rawlins and Gregory D. Wilson. 2014. Agency and interactive data displays: Internet graphics as Co-Created rhetorical spaces. *Technical Communication Quarterly* 23 (10 2014), 303–322. Issue 4. <https://doi.org/10.1080/10572252.2014.942468>
- [56] Pranee Liamputtong Rice. 1996. In Quality We Trust! The Role of Qualitative Data in Health Care. , 51-57 pages.
- [57] Maria Y Rodriguez and Heather Storer. 2020. A computational social science perspective on qualitative data exploration: Using topic models for the descriptive analysis of social media data. *Journal of Technology in Human Services* 38, 1 (2020), 54–86.
- [58] Aguinaldo Dos Santos. 2018. *Seleção do Método de Pesquisa*. 230 pages. https://editorainsight.com.br/wp-content/uploads/2019/04/af_Metodos-de-pesquisa_web.pdf
- [59] Hope Schroeder, Marianne Aubin Le Quéré, Casey Randazzo, David Mimno, and Sarita Schoenbeck. 2025. Large Language Models in Qualitative Research: Uses, Tensions, and Intentions. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, Article 481, 17 pages. <https://doi.org/10.1145/3706598.3713120>
- [60] Ansh Sharma and James R Wallace. 2025. DeTAILS: Deep Thematic Analysis with Iterative LLM Support. In *Proceedings of the 7th ACM Conference on Conversational User Interfaces (CUI '25)*. Association for Computing Machinery, New York, NY, USA, Article 28, 7 pages. <https://doi.org/10.1145/3719160.3735657>
- [61] Daisuke Tajima, Jun Nishida, Pedro Lopes, and Shunichi Kasahara. 2022. Whose Touch is This?: Understanding the Agency Trade-Off Between User-Driven Touch vs. Computer-Driven Touch. *ACM Trans. Comput.-Hum. Interact.* 29, 3, Article 24 (Jan. 2022), 27 pages. <https://doi.org/10.1145/3489608>
- [62] Karen Tanenbaum and Joshua Tanenbaum. 2009. Commitment to Meaning. A Reframing of Agency in Games. *After Media — Embodiment and Context, Digital Arts and Culture 2009, Arts Computation Engineering, UC Irvine* 3 (2009), 10. Issue 2. <https://escholarship.org/uc/item/6f49r74n>
- [63] April Tyack and Elisa D. Mekler. 2020. Self-Determination Theory in HCI Games Research: Current Uses and Open Questions. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (Honolulu, HI, USA) (CHI '20)*. Association for Computing Machinery, New York, NY, USA, 1–22. <https://doi.org/10.1145/3313831.3376723>
- [64] April Tyack and Elisa D. Mekler. 2024. Self-Determination Theory and HCI Games Research: Unfulfilled Promises and Unquestioned Paradigms. *ACM Trans. Comput.-Hum. Interact.* 31, 3, Article 40 (Aug. 2024), 74 pages. <https://doi.org/10.1145/3673230>
- [65] Larissa Ugaya-Mazza. 2023. Digital graveyards : a study about data visualization portraying death during the Covid-19 pandemic.
- [66] Ziang Xiao, Xingdi Yuan, Q. Vera Liao, Rania Abdelghani, and Pierre-Yves Oudeyer. 2023. Supporting Qualitative Analysis with Large Language Models: Combining Codebook with GPT-3 for Deductive Coding. In *Companion Proceedings of the 28th International Conference on Intelligent User Interfaces (Sydney, NSW, Australia) (IUI '23 Companion)*. Association for Computing Machinery, New York, NY, USA, 75–78. <https://doi.org/10.1145/3581754.3584136>
- [67] Tian Xu, Junnan Yu, Dylan Thomas Doyle, and Stephen Voids. 2023. Technology-Mediated Strategies for Coping with Mental Health Challenges: Insights from People with Bipolar Disorder. *Proc. ACM Hum.-Comput. Interact.* 7, CSCW2, Article 240 (oct 2023), 31 pages. <https://doi.org/10.1145/3610031>
- [68] John Zimmerman, Jodi Forlizzi, and Shelley Evenson. 2007. Research through design as a method for interaction design research in HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (San Jose, California, USA) (CHI '07)*. Association for Computing Machinery, New York, NY, USA, 493–502. <https://doi.org/10.1145/1240624.1240704>