# Gabber: Supporting Voice in Participatory Qualitative Practices

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## ABSTRACT

We describe the iterative design, development and learning process we undertook to produce Gabber, a digital platform that aims to support distributed capture of spoken interviews and discussions, and their qualitative analysis. Our aim is to reduce both expertise and cost barriers associated with existing technologies, making the process more inclusive. Gabber structures distributed audio data capture, facilitates participatory sensemaking, and supports collaborative reuse of audio. We describe our design and development journey across three distinct field trials over a two-year period. Reflecting on the iterative design process, we offer insights into the challenges faced by non-experts throughout their qualitative practices, and provide guidance for researchers designing systems to support engagement in these practices.

## CCS CONCEPTS

• **Human-centered computing → Collaborative and social computing systems and tools**.

## KEYWORDS

Collaborative Sensemaking; Audio annotation; QDAS

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## 1 INTRODUCTION

Digital audio tools are widely used to record interviews, discussions and focus groups in fields such as research, public consultation and journalism. While it is easy to capture large amounts of audio data, post-capture processing of that data is time and resource intensive, typically requiring the production and management of associated metadata, audio transcription, and expert analysis of transcriptions using specialist software. Research practices around the capture of audio and generation of metadata (e.g., the time, location and participants of a focus group) is ad hoc. Researchers typically record such metadata separately, e.g. in field notes or as annotations of interview schedules. The analysis step is usually conducted using sophisticated qualitative data analysis software (QDAS) to annotate and manipulate written transcriptions of the audio. While such software generally affords researchers the opportunity to directly interact with the audio, this functionality is complex and underused [45, 46].

In recent years, there has been a significant rise in the popularity of participatory research processes, i.e. approaches that engage research participants in all stages of research, from research question formulation to the dissemination of results. Such approaches require large scale participatory data capture, coupled with usable analysis tools. While data capture is feasible through readily available survey apps and websites, tools that allow researchers to both mobilize their participants in data collection and also contribute to the analysis of qualitative data are very limited. A process of participatory qualitative data collection should involve participants at every stage: in conducting and audio recording interviews (including soliciting and capturing informed

consent), in associating relevant metadata with those audio recordings and in collaborative sensemaking activities.

In response to these challenges, we have iteratively designed, developed and deployed Gabber, a platform to: (i) streamline and structure audio conversation capture; (ii) support collaborative sensemaking; and (iii) support the production of meaningful representations of the outcomes of the sensemaking process. Our field trials demonstrate a desire from stakeholders to actively participate in service feedback and illustrates the utility of Gabber in this domain. We envisage Gabber as a platform to make capturing and understanding service feedback more accessible and inclusive, allowing participants the chance to create dialog around these services and framing the whole process as a qualitative endeavour.

Our work reflects our own experience working with non-experts to capture, analyse and share qualitative data (through interviews, workshops, focus groups and using various forms of thematic coding). It is also inspired by past attempts to develop tools for amateur and professional media production. We show how this knowledge has influenced the development of Gabber, and describe its design and deployment across three diverse field trials; the diversity of which has significantly contributed to the final design.

Our work makes two contributions to literature on amateur media practice and non-expert qualitative research. Our primary contribution is our account of the design, development and deployment of Gabber: a digital platform for non-experts to capture audio conversations, interpret them as a community, and create media representations of their findings. Our secondary contribution, based on real-world experimental field trials of a series of versions of Gabber, is a characterization of the issues faced by non-experts seeking to capture and meaningful reuse audio across educational and professional contexts.

## 2 RELATED WORK

### Voice in Participatory Informatics

Voice contains nuanced characteristics of expression that can be effective in communicating the lived experiences, perspectives and opinions of individuals. Petrelli et al. [34] found that capturing and later consuming voice for reminiscing was an unobtrusive, fun and engaging experience for individuals unfamiliar with interacting with audio media. Voice capture plays an important role in participatory informatics as it can be a tool to support participants who wish to have their experiences heard, shared and understood. This can be achieved through reflective journaling [26], creating voice memories of food experiences of local cuisine [23], supporting civic dialogue around place making [12], or capturing service-user's experiences to inform service delivery [15, 16].

Voice capture can be sociable, informal and inclusive, allowing a wide range of participants to contribute to a debate. But despite those contributions, participants are seldom invited to contribute to the process of sensemaking. Where they are involved, participants usually partake in sensemaking (i.e. "how people make sense out of their experience in the world" [17]) activities only with the assistance of researchers [12, 29]. For example, in Dow et al. [15] an organization captured voice-based feedback to inform their organizational working practices, but discovered that despite their best intentions, participants could not meaningfully engage, interpret or purposefully reuse content from the large quantities of captured audio recordings. Dow et al. note that this may have been a result of the time required to consume audio compared to text, the skills required to meaningfully interpret content or the time and costs of transcription.

### Digital Tools in Qualitative Practices

Qualitative data is typically captured by professional researchers wishing to understand the behavior, perceptions, attitudes and opinions of individuals and groups [11]. This typically involves capturing audio or video recording of interviews or focus groups, yielding large, unstructured media datasets. Informed consent from participants, taken before and/or after such sessions allows researchers to use the data for a specified research purpose. Even in highly sensitive contexts, consent mechanisms are not incorporated directly into the systems used for digital capture [15, 23, 27, 29] but instead typically involves the manual creation of metadata and its association with the relevant media files and other documentation of the research protocol. The manual association of the metadata with the media (or its transcription) is often not undertaken in a manner that makes it searchable, accessible, and meaningful to collaborators.

Carter et al. [10] describe an example of an innovation intended to simplify the capture process more broadly. NudgeCam is a mobile application that uses templates of pre-defined heuristics to structure the video capture process in-situ and at the point-of-capture. Through the use of templates, the application guides users to create contextually relevant and higher quality video media in comparison to traditional methods. For example, a NudgeCam template might provide a list of tags that should be covered in a video interview, and that can be selected to show that they have been covered. Whilst effective for structuring the capture process, a significant limitation of NudgeCam is that the metadata captured through tagging becomes associated with the entire recording, rather than the specific time periods where that topic is covered.

Barkuus et al. [5] studied technology use in the fieldwork practices of social scientists and identified the challenges of replicating interviews between collaborators and the desire for a way to begin pre-analysis upon capture. Consequently,

they developed, TagPad [7], a tablet application designed for data collection and pre-analysis. Similar to NudgeCam, TagPad used interview guides to structure data collection by supporting metadata creation (audio recordings, text entry, etc.) in response to each interview question. The pre-analysis interface allowed the addition of custom tags to segments of interviews on an audio timeline, thus facilitating tagging in-situ. However, the authors did not explore the non-expert perspective, nor did they show how this metadata could help guide a production process.

Recognizing the benefits of in-situ templates for guiding amateur video production [1, 10, 13], Schofield et al. [43] proposed Bootlegger: a mobile application that provided shot-by-shot instructions for amateur video capture. Each video recording was captured with accompanying metadata that described the shot, helping to simplify the post-production video editing processes. User-generated templates were created as a script to guide capture and create shot metadata. This metadata streamlined the process of finding source clips during the editing process (e.g. "show me all the wide-angle crowd shots"). Unlike Nudgecam and TagPad, Bootlegger was designed for non-expert users, however, the creation of a meaningful output from its production process still required guidance from experienced users or researchers [29].

### Professional Software for Sensemaking

The process of qualitative research broadly involves three phases: (1) data capture (typically using audio or video recording); (2) data interpretation; and (3) reporting on insights and outcomes, which generally takes the form of a written report or academic papers. The data interpretation phase involves organizing and revisiting data captured in the first phase, such as transcribing captured audio and video. Bailey argues that transcription should be done by the researcher who will perform the analysis, as it is considered a "first step in analyzing data" [3]. Transcription simplifies the analysis process by making data easier to scan, search, share, view, compare, and anonymise [46]. However, transcription can often be a time-consuming process that can potentially alter the authentic voice of participants due to its reductive, interpretative nature [3] and may also remove nuances from voice that are challenging to represent as text, such as sarcasm, tone and subtle aspects of emotion [33, 46].

Existing qualitative data analysis software (QDAS) [18, 31, 37] are incredibly powerful and feature-rich digital tools for storing, categorizing and collaboratively analyzing qualitative data. They support a range of analytical approaches: thematic coding of written transcripts, associating codes across datasets, or visualization of codes on a per interview or dataset basis, and technical features, such as automated transcription [37]. These systems also support working with audio recordings directly (e.g. applying codes to regions of audio), however, this function is frequently underused by researchers as the involved processes are complex [46]. Transcripts can be used alongside these audio annotation interfaces to reduce complexity, and also to edit audio stories [39] and online audio discussions [42]. However, while transcripts simplified the production processes, their use did not really support sensemaking of content. Rather than become proficient in using QDAS interfaces, researchers instead focus on the coding of transcripts [32, 46]. Despite the growing use of QDAS, their cost, complexity and a steep learning curve make inaccessible to non-experts.

## 3 CONFIGURING NON-EXPERT PARTICIPATION

Our goal was to reduce the barriers to the collaborative participation of non-experts in the conduct of all stages of the qualitative research process, from the conduct and capture of an interview or discussion, to collective sensemaking and the representation of analysis outcomes. To do this, we worked with non-experts to better understand the challenges they face at each stage (capture, sensemaking, representation). Firstly, we sought to configure the capture process as an informal conversation rather than a structured interview. We moved away from a rigid, potentially one-way structure to a shared informal discussion between participants that made capture more accessible to non-experts. Secondly, we sought ways to facilitate the expertise and insights of participants as contributors to the analysis process. In many cases, their familiarity with the data and their lived experience of the topics discussed uniquely qualified them to contribute to the sensemaking process [36, 44]. We held 3 field trials across a two-year period with communities who were either interested in, or already actively engaging in, qualitative research and who wanted to make these processes more accessible.

## 4 GABBER PLATFORM

It is difficult to capture both the iterative stages of this design process and the various decisions made during it. We have attempted to provide an overview of this in Table 1, describing each field trial, its configuration across the qualitative process, and our learning from each that motivated the final design. Gabber was designed with and for non-experts and encompasses a complete participatory qualitative process (e.g. capture, sensemaking, consent, etc.) that makes it unique when compared with existing QDAS or research technologies [7, 10, 41]. The subsections that follow describe the final version of Gabber, and in the more detailed discussion of the field trials (sections 5-7) we outline the design motivation of each feature and how they evolved across the trials.

### Configuring Conversation Capture

The Gabber website supports creating and configuring of projects. Project creators have ownership and control over

**Table 1: How Field Trials (FT) differed & contributed to our understanding of non-expert's experiences of qualitative practices.**

| | | Configuration of Each Phase Across Field Trials | | | |
|---|---|---|---|---|---|
| **Field Trials** | **Collaborator Goals** | **Audio Capture** | **Sensemaking** | **Presentation** | **Design Learning** |
| **FT1:** *augmenting student feedback in a university class* | To capture informal conversations between students to use to augment the delivery of teaching. | The teacher created discussion topics weekly.<br><br>Weekly group discussions between 4 groups of 3 students. | The teacher listened to all content, making paper-based notes to document challenges faced by students in their weekly learning. | Teacher presented weekly feedback to the class, using quotes or original content to evidence challenges faced between students and their engagement with the student's content. | **Capture:** recording separate conversations caused interpretation to conversation flow and made sensemaking of this content cumbersome. |
| **FT2:** *reflective practice in a social care work environment* | Engage participants in personal and reflective practice by revisiting and listening to conversations.<br><br>To use participants experience to help identify insights in audio data to use as training resources. | Discussion topics mirrored organization's existing capture practices.<br><br>1 staff member had one-on-one interviews with 5 service-users | 5 service-users listened and commented on their recording.<br><br>6 staff listened and commented on all recordings. | A design activity was used to view and search through all highlighted recordings, and used the selected content to structure a timeline for training delivery.<br><br>The trainer curated content to structure training on complex needs to their staff. | **Sensemaking:** anonymization of names required to supported critical discourse. Tagging was familiar process to engage with content<br>**Consent:** flexible consent models required due to sensitive of experiences shared.<br>**Presentation:** content selection must be driven by user comments to avoid bias and cherry-picking of data. |
| **FT3:** *peer feedback on interview training in a university class* | For participants to contribute to all stages of the process, and simplify how feedback was delivered by distributing this amongst peers. | Topics were co-designed as a classroom activity.<br><br>All students had interviews with a participant outside class. | Codebook co-designed for coding interview techniques.<br>Students listened to 2 other interviews, and provided feedback through comments using the codebook | Teacher listened and curated content analysed by students and presented audio snippets as examples of the good/bad practices of conducting interviews to structure a class-based reflective discussion. | **Capture:** participants domain expertise informed the creation of discussion topics.<br>**Presentation:** teacher curated only student comments, which removed bias when selecting content and reduced time required to participate. |

what topics are discussed during the conversation capture process. A project consists of a name, description, set of discussion topics (used as prompts in the app) and a privacy setting of either public or private.

*Public.* users can contribute recordings to a project; captured conversations are available to all users, including those not logged into the website. The project creator can invite new members to the project via email. If a project is public and a conversation is created, then all participants of the captured conversation can join and become project members.

*Private.* projects and conversations associated with them only appear to members, i.e. users who have been added by the project owner or who have participated in a conversation.

### Collaborative Conversation Capture

A lightweight mobile application facilitates the capture of conversations, allowing individuals to contribute to ongoing research projects. Users can browse the list of public projects on the home page as a means of discovering new and existing Gabber research projects. Once a project is selected, users are taken to the participants screen where they can add the name and email of all the participants of the conversation. Once all participants are added and selected, users can navigate to the capture screen, which presents the list of discussion topics as cards; when the first topic is selected the recording begins and a stop button and a timer appears. If a new topic is selected, a color change indicates that one topic is finished and a new topic is active. Topics can be selected multiple times throughout the conversation. Each topic selection creates new timestamped metadata that denote the start and end of a topic discussion.

### Conversation Consent

Once the recording has finished and uploaded, all participants receive an email with a hyperlink to review the recording and indicate their consent, specifying how they want their recording and metadata to be used. Consent for a recording can be reviewed and modified at any time, giving ownership and dynamic control of the data to participants. The consent page shows relevant conversation metadata (audio recording, project details, etc.) to provide context alongside the recording. The consent form has three options and details who will have access to the recording after consent changes:

(1) **None (the default):** only participants of the conversation can view the recording and metadata
(2) **Private:** only members of the research team and participants added to the conversation

(3) **Public:** users without accounts can access recordings

The strictest privacy consent option given by an individual user drives the way the website will use the data. All members are notified if a project's privacy changes from private to public, and all recordings that were consented as private remain so. In addition, the consent process includes an embargo period where access to the conversation is only available to participants of the conversation for a set period of time, which can be configured by each project. After this period, the audio conversation becomes available depending on the privacy consent selected as described above.

### Sensemaking of Conversations

The Gabber webpage is split into three components: the right-sidebar shows project metadata including the date the conversation was created, the author and a list of participants. These appear as icons to conceal names from the associated project and recording. The left-sidebar is used for searching and filtering comments. The central section contains the recording and displays the comments. Any discussion topic metadata applied during data capture appear in the central section, beneath the recording, to add context to what and when topics were discussed. These are color coordinated with the comment and the associated filter. Comments are made as free-form textual responses that can be applied to regions of audio recordings while listening. When commenting, a region is overlaid onto the recording to illustrate the segment of audio the user is responding to (Figure 1). Comments appear in a horizontal list below the recording, changing as it plays, which has shown to increase engagement with regions of video content in online educational contexts [14, 28].

Note that comments were chosen for sensemaking as they are a key tool for data interpretation by researchers (i.e. coding) and are commonly used by non-experts when discussing online content [22, 43]. They have become a standardised and effective method of annotating web material [40].

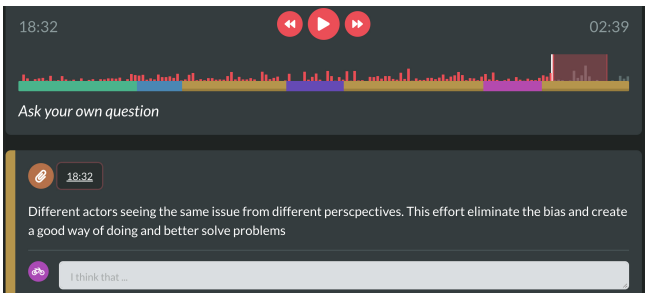


**Figure 1: Responding to a comment on a captured conversation. Topics are overlaid below the audio recording and users are represented with avatars to support anonymity.**

### Organizing Content into Collections

The curation interface supports reviewing project recordings and making playlists from the annotated audio to allow users to capture points of interest for a specific project. The central area displays all annotated regions for the associated project in list format and a media player is positioned at the bottom of the page where users can begin to play the first region, followed by the next until the end; a user can click any region to play it directly (Figure 2). Users can then add annotated regions to playlists while listening to a recording, and have the option to write a memo, which provides context when the playlist is shared or revisited at a later date. Once added, regions can be reordered or removed from playlists.

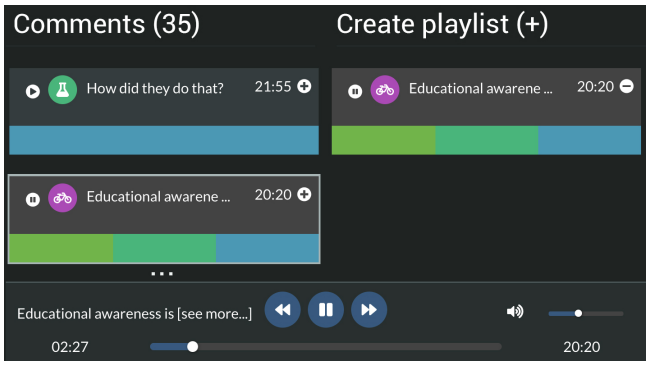


**Figure 2: Creating a playlist from commented regions.**

## 5 FIELD TRIALS

Our aim through these field trials was understanding how digital tools can augment existing qualitative research practices to make them more inclusive, accessible and meaningful to non-experts throughout the qualitative process. We took a participatory action design (PADRE) approach [24, 25] to understand the requirements of each context to inform the iterative design and configuration of Gabber. PADRE is a design method that draws elements from participatory action research [6] and design research for designing artifacts and allowing for their emergence in an organizational context [25]. We see PADRE as the tight interaction between stakeholders and researchers with reflection and learning as an ongoing, iterative process to produce an artefact that responds to the needs of stakeholders.

These design iterations informed how Gabber was initially presented and configured in the field trial that followed. Field notes from conversations with participants and observations of prototype use were documented throughout this process. Semi-structured interviews were conducted with stakeholders from each field trial (3 students and 1 teacher in FT1 and FT3, all service-users and staff involved in FT2) to gain insight into the perceived benefits and challenges using the Gabber prototype. Each interview was conducted at the end

of each field trial, lasting 20–70 minutes. Qualitative data was transcribed and analyzed using thematic analysis [8] to guide the design process within each field trial. Stakeholders in FT1/3 were from the same university department, but with no direct relationship to authors. Stakeholders in each field trials were participants in our study and were not involved as research collaborators or co-authors. The authors had no previous collaborations with stakeholders in FT2. The following sections outlines the design challenges of each field trial (FT) and how Gabber was configured to explore them.

### FT1: Augmenting Pedagogy Feedback

Student feedback on teaching and learning during university courses generally occurs at the end of the semester through surveys or questionnaires. This structure limits students to providing feedback that does not directly affect their learning. How the feedback impacts the curriculum is also often unclear, making this a "black hole" of feedback similar to what is experienced with public-services [15, 16]. From September to December in 2016, we worked with a university lecturer who wanted to shift their teaching feedback process to weekly, informal peer discussions on the course's content and teaching. Capturing informal, natural and rich dialog was the main requirement of this field trial. This raised challenges with how we might prompt these types of conversations, and how we might capture these through audio while reducing the time required to interpret it.

To that end, Gabber was configured to elicit weekly discussions on the content of the class. This allowed the teacher to be reactive, tailoring the pedagogy for the following week and giving literature suggestions to individual students based on their discussions. The discussion topics were configured to use text (i.e. "something that has confused you") and an image with the aim of making this process more engaging. Each week, students were divided into groups of three such that all students had discussions with all others. The teacher listened to student's conversations and presented to the class each week on how this week's class differed based on their discussions. The Gabber website displayed all recordings alongside the topics discussed on a per-week basis. The teacher listened and made paper-based notes as the primary sensemaking activity. No comments or playlists were created as exploring the capturing process was the focus of this field trial.

### FT2: Reflection in a Sensitive Context

From September 2016 to November 2017, we also collaborated with FL, a charity organization that helps individuals with complex needs by connecting them with suitable local services. Critical to the organization is the delivery of training on complex needs and reflective practice, which is given to external organizations to help them better understand their shared client base. Prior to our collaboration, FL had been using snippets of audio conversations they captured with service-users to evidence insights and drive reflective discussions during training sessions. This entire process was being run by one employee, necessitating similar material being used across training activities and, consequently, restricting what could be discussed during training. This also meant that this sensemaking process was inaccessible to other employees, who could have gained value from listening and engaging in the process. FL's goal was to make their existing process more open, accessible, and active for their staff, service-users and trainees, and to help identify insights that could be used as training resources. They hoped this would result in a more diverse and relevant dataset agreed-upon by the community, supporting discussions on reflective practice and other topics relevant to this sensitive context.

FL configured the capture process to mirror their existing practice: 11 topics with associated images were used to structure a reflective dialogue between a service-user and a staff member. These topics were 'direction', 'motivation', 'side-tracked', 'stuck', 'problem', 'emotion', 'conflict', 'help', 'plan', 'act' and 'reflection'. As an example, for the topic 'side-tracked', participants were asked "What sort of things do you think get you side-tracked when you have plans?". One senior staff member took lead for capturing conversations (S1), recording five conversations with service-users who discussed their lived experiences with complex needs in relation to each topic. We then worked with the organization to develop a codebook (containing 26 codes) to support the commenting on and coding of conversations by staff and service-users to identify and respond to emotional content. In total, 110 comments, comprising of 320 codes across four 45-minute conversations were created: one service-user created 7 and five staff created 103 (of which S1 created 72).

From this corpus of tagged content, we held a Wizard of Oz design activity with one senior staff member to select content for use in the delivery of training within their organization. Our aim with this activity was to understand the types of questions that might be asked of the coded corpus of data. To that end, the researcher acted as a 'search engine' for the FT2 conversations, listing the snippets of audio on a single page and querying the data in response to S1's questions. The researcher then selected matching conversations or jumped to relevant comments depending on S1's requests. When S1 determined that a snippet of conversation was suitable for use in training, they replayed before and after to determine when to cut the audio to create a production ready recording. This process provided insights into the section of material for reuse that informed the playlist interface of Gabber.

### FT3: Peer Feedback in Interview Training

In September 2017, we were approached by a university lecturer (MW) who wanted to use Gabber to simplify how he

and his students provide feedback on interviews they capture as part of their practical learning of qualitative methods. To that end, we conducted three two-hour sessions with MW who taught a post-graduate module on qualitative research methods to 12 students. In previous years, the course had been designed to give students practical experiences of conducting interviewing, but was time-consuming and repetitive when giving individual feedback. Instead, the teacher wanted to support peer learning by having students listen to each other's interviews and apply codes to the positive (i.e. intended pauses) and negative (i.e. leading) aspects of interviews based on what students had been taught. These student-led insights from the highlight media would structure group feedback and reflective discussion. The interview schedule and codebook used to structure peer-feedback was co-designed with students as another learning opportunity to apply the theory taught in class during this process. The consent process was used by participants to determine if they wanted their recording reused in class for training purposes.

## 6 FINDINGS FROM FIELD TRIALS

The following sections present a chronological account of how these field trials informed the design decisions we made, and how features of Gabber evolved across field trials. We describe key findings alongside a reflective account of our collaborations on a per-phase basis with each referenced using the labels defined above (FT1, FT2 and FT3). When capturing conversations, FT1 and FT2 configured Gabber to use both images and text, while FT3 only used text. FT1 only used Gabber for capturing students' conversations.

### Conversation Capture

Capturing the lived experiences of participants in their natural form was a core requirement across field trials. A mobile prototype was designed for FT1 with the aim of making audio conversation capture a simple yet structured process. The content of conversations recorded during FT1 were informal and topic-focused, with the frequent use of humor to diffuse tensions within groups. A common occurrence across groups was that one student would take a "speaker" role, reading out each new topic and provoking discussion from others. Three design issues emerged in FT1. Firstly, recording separate discussions for each topic produced stilted question-answer responses rather than free-flowing conversations, which students found frustrating. Secondly, despite discussion topics being designed to produce short, focused conversations (e.g. 'the workload'), students often had tangential or in-depth discussions, which produced very long audio recordings. Thirdly, the use of open-ended images alongside the textual prompt often distracted them from starting their conversation ("Why's [the teacher] chosen this?!").

In response to these findings, the prototype was redesigned for FT2 to capture a single audio recording that stored metadata of what discussion topic was being recorded and when. Despite the challenges of using images in FT1, FT2 retained images as the service users were familiar with them. One problem during FT2, was that the discussion topics chosen were overly formal and more akin to interview questions, which asked too much of the participants. The 'interviewer' often had to reframe the question multiple times for participants to meaningfully respond to topics. Consequently, this produced extremely long audio conversations (M=40.2, SD=25.5), limiting engagement to a smaller portion of content. Nevertheless, the conversations were experientially rich and highly topic specific — capturing dramatic changes of mood that would be otherwise difficult to express in textual form. For example, on the topic of "emotions" one participant was happy to discuss how they felt about their current drug use, but became aggressive in response to the interviewer probing how they "felt when others ask you to buy heroin", with the participant responding that:

> "Know what I want to do? I just want to headbutt them and tell them to fuck off. Do you know how hard it is to get off that drug mate?"

Learning from this, we worked with participants in FT3 to co-design the discussion topics to ensure focused yet informal conversations occurred through Gabber. Although these conversations were recorded outside of the classroom, the content produced was equally rich as that captured in FT2.

Capturing conversations in Gabber evolved from creating short, individual recordings for each topic (FT1), to recording a constant conversation and tagging it with topics as the conversation changed (FT2/3), with text becoming the focus focus of topics (FT3). We note that the design of the discussion topics is critical in determining conversation style, formality, and recording length, which affects the listening experience that follows.

### Consent and Ownership

We wanted to explore the way informed consent processes could be embedded within digital tools to see what challenges this might raise. To that end, during FT1 we incorporated an email assent workflow, where students could decide after recording their conversation if they want this media to be accessible to the teacher or remain private (the default setting). Most participants allowed for their data to be made accessible to the teacher, however, when participants did not assent, we observed that the teacher would question them on their decision. This was problematic: the teacher could determine which students did not upload content and the power dynamic between teacher and student meant that consent may be induced rather than freely given.

This consent process was initially left unchanged for FT2, however, due to the sporadic nature of the service-users lives and their limited access to technology, paper-based consent was used to mirror the three options described earlier. In addition, initial consent to taking part in the study was given prior to recording any conversation with the caveat that they could withdraw consent at any time. During FT2 conversations, participants often revealed confidential, personal, and potentially incriminating details. Some expressed views or made accusations that were potentially damaging to other individuals. This naturally raised concerns from the host organization about whether these conversations could genuinely be reused or shared with other services, as per their current practice. These sensitive conversations included describing family members (name, age, place of work, location), experiences breaking the law (including activities they had not been prosecuted for) but also incorporated critiques of services used. For example, one participant revealed personal details that could be used to locate his sister:

> "If you look at my life you think … How'd you end up like that [sisters name]? Cause' she's a manager at [restaurant] in [City] and she's been working there for 8 years now and started at 18."

Participants of FT2 also critiqued some of the services that they had used in the past, which could affect them gaining access to those services in the future. One participant gave a critical description of the drug recovery and homeless shelter services she had used, while another described how service-users used drugs when in temporary accommodation:

> "I've been off legal high for 9 months and smack for 2 weeks and that's absolutely mint. When I was living in there I was on it [legal high] every day and most people living there are as well."

In addition, during FT2 one participant relapsed four weeks after having recorded their experiences, which made staff reluctant to use this recording during the sensemaking phase. At their request, it was hidden from view within the system. It was clear from FT2 that our consent model could fall short in circumstances where conversations are conducted in highly sensitive contexts and where access to technology is a limiting factor. It prompted consideration of how and when a service might take the lead on managing consented data with vulnerable populations.

In FT3, students created conversations with external participants who were unfamiliar with the system or the consent procedure. In this field trial, approximately half of all conversations were unused because consent was absent. We contacted these individuals to explore this issue and it became clear that many did not notice the consent email, others did not follow the embedded link in order to review their consent and they had not realized that not responding would impact the teaching practice. These factors, combined with the previous challenges lead us to consider alternative models for consent. One model in particular was the possible use of in-application informed consent that is agreed upon prior to starting a conversation, combined with post-assent of the data if suitable. These additional measures might be a more appropriate means of providing participants great control and ownership over the data within this qualitative process.

Consent in Gabber evolved through field use in FT1/2 and raised issues of power dynamics (FT1), and confidentiality and ownership (FT2). This lead us adopt an embargo period in FT3, with findings highlighting the need for alternative models of consent as described previously.

### Sensemaking of Conversations

The shared goal across field trials was to have an lightweight way to highlight insights across conversations and to make this process accessible to our non-expert participants. During FT1, it was the lecturer's (L1) role to undertake sensemaking of the entire dataset on a weekly basis, which resulted in a "light touch" approach that overlooked nuances in issues raised by student's due to the limited free time available to engage with content. We sought to understand how L1, an expert in qualitative analysis, approached this sensemaking process. Initially, we designed a single-page website where all weekly audios were presented and tagged with the discussion topic and speaker. While listening, L1 made paper-based notes to document the challenges or suggestions made by students and the timestamp where this discussion took place. The intention was to use the original audio data to provide feedback to students in the following weeks' class, but the workload attached to this process was significant.

FT2 was configured to support participants involved in the capture process (service-users and frontline staff) engaging opportunity with data sensemaking. This meant that the sensemaking task was distributed across a wider community of participants who were effectively 'local experts' with rich contextual understanding of the content discussed. This meant that participants could highlight rich insights quickly and effectively. We had redesigned the sensemaking prototype to support a collaborative, community effort, introducing functions that would allow a participant to highlight, comment and create dialogue around specific regions of the audio recording. However, we hit a problem around the personal, and potentially incriminating details shared by service-users (described above), and so we had to configure the prototype such that service-users could only have access to their own recordings. The sensitivity of this field trial raised a number of design challenges around privacy and data protection as described in the previous section.

Service-users and staff within FT2 engaged in the sensemaking process, but one issue that emerged from this was

that staff knew that their name would be associated with comments, which made them hesitant to engage with the process as they did not wish to "upset other workers" by being seen to challenge or criticize their working practices. That said, all staff members interviewed said that the process had been useful and provided new knowledge that they could "use in the field". The power of voice was highlighted by many participants who made explicit reference to 'genuine' conversations and discussed the importance of emotional tone. One service-user, upon revisiting his conversation, said that he had been made to "realize his own words", which service-staff attribute as a "big part of his recovery". Staff recognized that the process of capturing and revisiting conversations could be invaluable for mapping and reflecting on recovery with their clients. Recognizing that this was an important aspect of design, we drew from existing coding practices and QDAS, and introduced a function whereby commenters could apply codes alongside their comment, to support searching and filtering during the curation process.

Finally, building on the challenges raised around reluctance to share opinion through comments, the prototype was redesigned to anonymize participants names for FT3, which lead to more critical and informal comments being produced. In contrast to FT1, students were empowered as contributors in the sensemaking process to identify insights from data they captured, and shifted the role of the lecturer from sense-maker to curator of these highlighted insights.

Sensemaking in Gabber evolved from understanding existing practices of listening to tagged content (FT1), developing a prototype for discussing (through annotations) captured content (FT2), to augmenting this for pseudonymity (FT2/3).

### Curating Conversations

Representing insights from the sensemaking process was critical during FT2 and FT3, but how this material was selected and used varied significantly. During the Wizard of Oz activity in FT2, S1 was biased towards selecting content that they had listened and commented on, often disregarding the most popular staff-generated comments and codes. This illustrates that non-experts may need support to ensure that they are making fair, unbiased representations of data they curate. For S1 it was important to select a diverse range of participants' perspectives to evidence a balance of voice during their delivery of the content.

Building on our observations of this process, we designed a new prototype (section 4.5) for use in FT3. During FT3, the lecturer had not been involved in the data sensemaking phase as they did not want to introduce bias when curating the dataset similar to FT1. Consequently, selecting content was driven by the codebook and therefore depended upon the highlights generated by students to drive the selection process. Initially, L1 listened to all 37 conversation snippets in-turn to get an understanding of the data, then jumped to relevant snippets based on the content and codes applied by students. L1 began to see similarity between snippets, and selected content that would equally evidence the positive and negative aspects of interviewing. Similar to FT2, it was critical for L1 to select content from a range of participants as to not single out any individual, and to also provide equal learning opportunities and feedback amongst the class. 12 snippets were chosen, totaling 2 minutes. This is significantly shorter than FT2 and covered a broader range of experiences.

### Reusing Conversations

Meaningfully reusing the curated representations of the sensemaking process to create further discourse amongst the community around shared experience (complex needs and interview training) was critical during FT2 and FT3. How these representations were used shared commonalities across FT2 and FT3. S1 used the curated material to deliver a training session within their organization, lasting 93 minutes. When delivering the session, S1 provided context to introduce each recording before playing them and asking an open-ended question to the group to consider what they heard in relation to their existing work practices. This resulted in group members sharing detailed, personal experiences that related to the content of the audio. The openness to share these personal details (relating to traumatic life experiences) in response to audio could be due to participants having experiences with similar challenges experienced by service-users in the audio recording. During FT3, the resulting teaching session lasted 25 minutes, and was delivered in the same format as FT1: snippets of conversation were played in turn, with the teacher prompting the class into a group discussion after playing each. The prototype simplified how content was delivered, enabling the teacher to jump between content or pause when necessary. Similar to FT2, conversations produced as a consequence of this prototype were primarily reflective discussions around the data, with students relating and discussing their own experiences with issues raised by the teacher. This, along with the sensemaking process, supported students reflecting on their work practices.

## 7 DISCUSSION

Our findings across three distinct field trials illustrate the value of preserving voice, and the usefulness of sensemaking tools that allow non-experts to structure audio content in a collaborative way, both online (through content interpretation) and offline (through reuse of curated media). Our 'non-expert' participants were able to actively contribute to the capture, sensemaking and curation processes, although the contexts and participants were very different across the three field-trials. Nonetheless, participants expressed the

value they got from engaging in the process for both learning and reflection as outlined above. We will now discuss three themes (social sensemaking, configuring participation and consent beyond data capture) that we identified across all phases of the qualitative process that we believe should be considered when designing future technology in this space.

### Significance of Social Sensemaking

A common thread across our findings was the way that collective sensemaking activities [20, 30] were undertaken and valued by participants. These would provide the means for them to reflect on their own practices and understand how those practices affected others (i.e. service-staff attributing this process to the recovery of one service user). Across each field trial, sensemaking was fundamentally social as participants wanted to share their own experiences in relation to the content presented (snippets of audio corpus, etc.).

### Configuring Participation

Our work highlights that individual actors (i.e. teachers in FT1/3 or lead staff in FT2) during each qualitative phase took ownership over the configuration of the platform and directed participation from other actors (students, employees, service-users). This became a bottleneck during FT1/FT2 as the framing of discussion topics were driven by one person (albeit a domain expert), which then influenced the length and formality of conversations captured, and limited the contribution of participants in the sensemaking process. Our aim was to draw more closely upon participants' own local knowledge and expertise [44], and so we wonder how this pre-capture phase could be redesigned to better engage community actors, effectively giving them more control about what should be captured. This aligns with emerging work that aims to empower ordinary citizens to capture data as part of larger social science projects, although we recognize that many of these projects offer participants the opportunity to make key decisions about what data is important [35]. Richardson et al. argue that technologies that grant greater creative control over content can create opportunities for sharing personal values and experiences, promoting local stakeholders' agency and active citizenship [38]. We therefore wonder how alternative models of commissioning of content (e.g. [21]) could apply to support participants in collectively debating the best ways to structure a capture process. We came closest to this in the co-design activity of FT3, where we worked with participants to think about the kinds of data to be captured in that field trial.

### Consent Beyond Data Capture

Gabber was designed to democratize the collection and sensemaking of audio content, with the aim of making that content available more widely. This inevitably meant that rigorous consent procedures were critical. Our three field trials suggested that different models of consent might be appropriate for different participants. In particular, FT2 introduced new challenges, when the project creator decided to remove data that had been created (and consent provided) by a vulnerable participant who subsequently experienced significant difficulties. This demonstrated a need for a flexible and dynamic informed consent process, whereby a gatekeeper could revoke consent, allowing the vulnerable participant the opportunity to review this at some later date. This resonates with recent HCI discussions around the ethics of data collection and reuse [9] and work on some of the design factors that promote more thoughtful consent decisions [4].

Another tension observed during the curation phase in FT2 concerned the ethical implications of using curated audio outside of the system, i.e. as a training resource that would include highly sensitive content. Audio data is not easily anonymized, which suggests again the need for clear, easily communicated guidelines about how widely any of the data captured should be disseminated and which should respect the participant's chosen consent choice. We need to recognize that decisions made at the start of a Gabber project (such as its privacy configuration) may need to be revisited during the project's lifetime and understand how that will affect the participants' data. In legislative terms, Gabber was developed during the run up to the EU's General Data Protection Regulation (GDPR) [19], which requires explicit consent for personal data collection and reuse but which also requires higher degrees of transparency around data use. These principles informed our design, but some of the issues raised in FT2 have made us consider future consent procedures. Specifically, when material is curated, how can a participant know where and how their data was used? Making both the provenance and governance of this data transparent could hold the project creators accountable for how it is used, and enable participants to view potentially retract their consent from specific uses of their data.

## 8 CONCLUSIONS

Through three distinct field trials with non-experts who were engaging in qualitative practices, we have iteratively designed Gabber, a digital platform that aimed to make this qualitative process more accessible and inclusive to non-experts. There are a number of unique design elements to Gabber and in this paper, we have tried to give a sense of the function and utility of the overall system. Across our three field trials, it became clear that the same system deployed in different contexts can produce very different results, not least because of the wider contextual and organizational factors at play. It was the configuration of how participants contributed to each phase that was fundamental to engaging

them and other community actors in these qualitative research practices. We have illustrated that simple techniques for capturing metadata that are familiar to non-experts promotes reflection and discourse around content that is familiar and important to these communities and shown a need from participants for flexible, dynamic consent models. Future iterations of Gabber could benefit from utilizing transcripts from automatic speech to text services ([2]), e.g. to simplify searching for content during the curation process.

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